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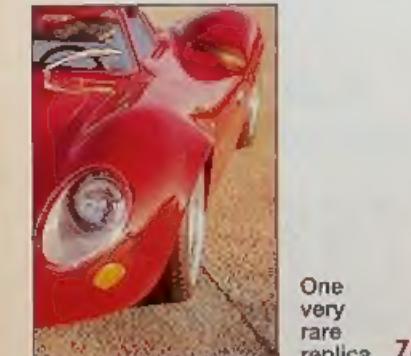
A new body double from Warlock 14



A Cobra replica with '90s tech 38



Great pretenders
for great prices 50



One
very
rare
replica 74

On the Cover: Lynne McCready captured model Ileene Voss doing her best to make fiberglass work look like fun. For more shots of Ileene and the new Warlock exotic, see page 14. And don't forget to check out our special section on fiberglass starting on page 21. Jim Youngs grabbed the Viper look-alike from M&M featured on page 28. For more low-cost replicas, see "Great Pretenders" on page 50.

& WHITE HOT

KIT CAR

THE SPECIALTY CAR MAGAZINE

July 1995 • Volume 14, Number 4

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UP FRONT

New Kit Car Show

Have we got some good news for you. It's official: Kit Car magazine is throwing a party, and you're invited! Actually, it's a kit car show, but that's basically the same thing, right? Anyway, we're planning to have a special Kit Car Corral at the Hot Rod Power Festival in Commerce, Georgia (northeast of Atlanta, near Athens), on August 25-27. Longtime readers already know that Kit Car magazine started as a spin-off of Hot Rod, so there's a strong kinship



PHOTOGRAPH BY TOM THOMAS

**KIT CAR AND HOT ROD MAGAZINES' EVENT
ON AUGUST 25-27**

with rodders. Also, many of the aftermarket parts on display at the Power Festivals are just the things we need to complete our kits. Due to the large number of kit car manufacturers and builders located in the Southeast, look for a huge turnout of vehicles. This is a great opportunity for kit car enthusiasts to see and be seen. In addition, we'll have a chance to show rodders just how quick kit cars really are on an eighth-mile dragstrip with side-by-side street-style racing. Other feature attractions include a big burnout contest, the Miss Hot Rod swimsuit contest, a manufacturers' midway, giveaway prizes and much more. As editor of Kit Car, I'll be there covering the event, awarding trophies to outstanding kits and taking photos of them to

feature in the magazine.

Showgoers who wish to display their vehicles can save a few bucks with the \$30 early-registration fee (or pay \$45 at the show site). Owners of display vehicles will receive a goodie bag with a hat, a pin and a copy of Petersen Publishing's new Event Scene magazine.

PLAN TO ATTEND

They will also be eligible to win prizes and a show trophy. Exhibitor space for manufacturers and builders is still available. For more information on how to enter and space reservations, mail in the entry form on page 61 or call Julie Leonard at 213/782-2731. So don't miss out on all the fun—I hope to see you there!

Steve Temple

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MAILBOX

SPORTS CAR SMITTEN

I've seen many sports cars in my life, but when I saw the Ferrari F40 I said to myself, "What if I could build one? Maybe I could get a car that's similar and slap a lot of body filler on it to give it the shape of a Ferrari. Nah, it would probably take a lot of time, and the Bondo would crack later on." Two months later I picked up my first copy of Kit Car magazine, and there was the car of my dreams just waiting for me to put it together! It was the Candy Apple Finale. Since I'm a body man, it'll be a piece of cake to put together, I just want to let you guys know that you're the best.

Viorel Atudoraoe
Kent, WA

We're always amazed to hear that there are still people out there who are completely unaware of the kit car industry. But thanks for the compliment, and let us know how your project turns out.

PHANTOM SEARCH

I'd like to make an appeal through the pages of your magazine for any information on either the Turbo Phantom or the Monocoque Box. The Phantom is a spectacular three-wheeler based on a



See this issue's Specialty Scene for an update on the Riot project.

CAT SCRATCH FEVER

Years ago my dad borrowed a '72 Jag XKE E-type convertible, and I went nuts over it. As hard as I tried, I couldn't find a suitable kit—until I read the Show-Off section in your November '93 issue. I want to know everything you can tell me about it.

Glenn Cook
U.S.S. Simon Lake

You can find more information about the JPR Wildcat by contacting Terry Green at G.T. Motorsports (216/327-6451). Also, Braden River Engineering has just introduced an XKE rebody for the Mazda RX-7, featured elsewhere in this issue ("Great Pretenders").

KIT CAR CONVERT

Automobiles have been a passion of mine since I was 9, and I want to introduce my son to the hobby. I feel that kit

what happened to the copy manufactured by Elegant Motors? Granted, E.M.'s model isn't nearly as faithful to the original, and I have always considered it overpriced. Nonetheless, it has been around a long time, so it must be satisfying the majority of demands enough to continue limited production.

William Henry Hull
Denver, CO

The Elegant Motors Cheetah kit is alive and well and living at Indy Exotics (see "Nine Lives," November '94, or call 317/881-9067). It comes in two basic models: a stretched version that fits on a Corvette chassis and an original-length body that fits on a custom chassis.

RIOT IN PROGRESS

After seeing Adrian Corbett's Riot in your September '94 issue ("Back to the Future"), I'll do whatever it takes to find the time to build one. I was so impressed, I immediately spec'd out a handbuilt custom chassis with a fuel-injected 13B rotary, disc brakes, sway bars, 17-inch Fittipaldi wheels, Comp T/As and so on, and a well-known Florida chassis builder needs only my American Express number to begin work. The only problem is finding Corbett Automotive. The number you published is no longer in service. Please help me track him down, and keep us readers posted on the "Riot in Progress." If you find him, tell him I want one even if he can't keep the price under \$6000.

Bret E. Simpkins
Amarillo, TX

cars are the future, as opposed to collector and antique cars. Since donor cars seem dirt cheap and the number and quality of kits seems to grow constantly, I'd like to build a car. I have little income, though, so I really like the budget buildups. My wife hates the Cobras, but I think they're great. VW Beetles and Fieros are scarce here in the Midwest, but 280Z donor cars are readily available. If a budget-based four-seater street-rod kit were available, I would buy it. At any rate, I sincerely want to let you know that you have a first-rate magazine, and my friends, the guys at work and I enjoy it very much. Thanks a million!

Christopher A. Hatch
Columbus, OH

For a really budget-based street rod, check out the \$3995 Piranha highboy kit ("The Price is Right," May '95), which fits on a VW Beetle (with millions



of Bugs on the road, you should be able to find one in your area or buy a stripped chassis from a salvage yard). Also in that same feature is a \$2700 Cobra-style rebody for the Datsun Z-car from Native American (916/348-8950).

SORRY, WRONG NUMBER

I recently wrote to B.G.W./Spectre Ltd. for information on its California Speedster VW kit ("Top 100 Kits," September '94, page 50). My letter came back because it couldn't be delivered at the address listed. Do you have this company's current or correct address? Thank you.

Mark C. Wood
Mt. Territory, WA

We hear that B.G.W. has just acquired a number of new VW Beetle kits from Burley Industries. Contact B.G.W./Spectre Ltd., Dept. KC07, 2534 Woodland Park Dr., Delafield, WI 53018 (414/646-4884).

Letters in Kit Car reflect the opinions of the writers and do not imply the endorsement of this magazine. All letters should be addressed to Kit Car magazine, 8420 Wilshire Blvd., Los Angeles, CA 90048-5515. Letters should include the writer's name, address and telephone number. We reserve the right to edit letters for clarity, brevity or other editorial purposes. Due to the volume of mail received, we cannot answer letters privately.



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SPECIALTY SCENE



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DARRYL'S NEW FLING

If you feel Cobra replicas are as overexposed as the O.J. Simpson trial but still want a racy-looking roadster, Darryl Fling of DB Enterprises may



have the right verdict. The company has introduced a replica of the '54 Maserati A6GCS Barchetta, a winner at Le Mans, Targa Florio and Mille Miglia. Fling says the body molds were taken off an authentic Barchetta. Powered by a 270hp 3.5-liter aluminum Rover V8 (originally a Buick block), this reproduction features a five-speed transmission, a four-bar custom live axle with a limited-slip differential, coil-overs and A-arms at the front, four-wheel disc brakes and 16-inch wire wheels with knock-off spinners. Turn-key vehicles are available for \$45,000, and a partially assembled kit starts at \$13,000. Contact: DB Enterprises, Dept. KC07, 22711 Hwy. 36, Cheshire, OR 97419, 503/998-3283.

PISA'S HOT TOPPING

Regular readers may recall the Ziero Fiero rebody ("Econo Exotics," July '94). Dan Campbell of PISA has



acquired the molds and added the Ziero, renamed the ZR-2, to his growing stable of Fiero conversions. The clean, sharp-looking body kit was influenced by several different ground-effects packages available for the Corvette ZR-1, hence the similar name. Priced at \$3995, the complete ZR-2 kit includes a front clip, a front hood vent, rocker panels, a rear clip, a sport wing and lights. Components are available separately as well, so the assembler can create his own look or do the buildup in stages. The stock hinges, latches and mounting points are used to attach and align the components with the Fiero chassis, and installation time is estimated at 40 to 60 hours, with only minor fiberglass work required. PISA also offers a wide range of other Fiero body kits and performance upgrades, including brake and engine packages, earning the company the nickname of "Fiero H.Q." Contact PISA Corp., Dept. KC07, P.O. Box 15088, Phoenix, AZ 85060, 602/376-1550.



now he has decided to start his own project called the Speedster M-2. It features a steel-reinforced hand-laid-fiberglass body that fits on a shortened VW pan. For \$9000, the kit includes a primed body, a steel subframe, gauges, a steering wheel and lights. The windshield, door mechanism, hoods and wiring harness are installed prior to shipping. The \$17,500 turn-key package also features a choice of color, a vinyl interior, a 1600cc engine, a drop front suspension, custom aluminum wheels, low-profile radial tires, a cloth top and a tonneau cover. Contact: I.C.M. Industries, Dept. KC07, 901 S. Greenwood, Unit A, Montebello, CA 90640, 213/728-4441.

PORSCHE PROJECT

Peter Huang of I.C.M. Industries has been a professional assembler of Porsche Speedster replicas for five years, but



now he has decided to start his own project called the Speedster M-2. It features a steel-reinforced hand-laid-fiberglass body that fits on a shortened VW pan. For \$9000, the kit includes a primed body, a steel subframe, gauges, a steering wheel and lights. The windshield, door mechanism, hoods and wiring harness are installed prior to shipping. The \$17,500 turn-key package also features a choice of color, a vinyl interior, a 1600cc engine, a drop front suspension, custom aluminum wheels, low-profile radial tires, a cloth top and a tonneau cover. Contact: I.C.M. Industries, Dept. KC07, 901 S. Greenwood, Unit A, Montebello, CA 90640, 213/728-4441.

What does Car & Driver Magazine say about Everett-Morrison's

Cobra
REPLICA
427SC



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"...we have an Everett-Morrison kit designed to accept the current Corvette suspension. Owner Larry Rea of Cedar Park, Texas, built it with his son, Lucas, in ten days."

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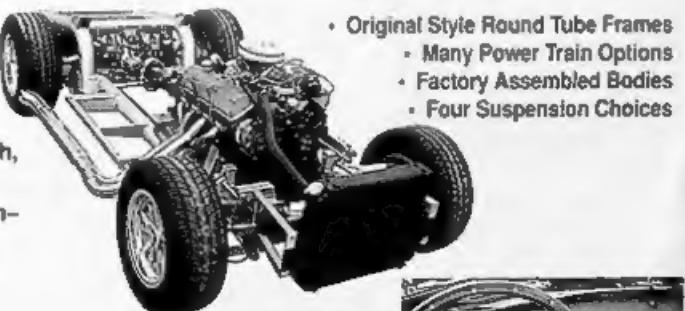
"Braking was exceptionally good at 161 feet from 70 mph, and 1.04g was measured on the skidpad."

"This car holds our record for fastest through the slalom—averaging 71.2 mph (the Nissan 300ZX Turbo did it at 69.6 mph, the old record). Steering response, though, was quicker than lightning."

"Everything about the car is skewed in the direction of steering quickness... its light weight, its rear weight bias, its power steering, its short wheelbase, and its low-profile tires on wide wheels. The combination makes a standard Corvette feel as lethargic as a Limousine."

"... the Corvette suspension was more composed than any of the others."

Car and Driver Magazine, December, 1991.



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DROP-TOP DATSUN

The Z-car makes a great donor car for various kit projects, but some projects require chopping the top. Priced at only \$995, Origin's new Convertible Conversion Kit is designed to make that aspect of the project a lot easier. The package includes an 11-piece steel-frame kit with a rollbar, a fiberglass rear deck with a hinged lid, and installation instructions. A fiberglass hardtop, an airdam, bumpers and air vents are also available. Contact: Origin Design, Dept. KC07, 114 W. Erie, Tempe, AZ 85282, 602/829-0759.



SPECIALTY SCENE

SAVAGE BEAST

It seems as though more and more folks are getting into reptile replicas these days, and we're not talking about Cobras either. The Geetz Savage is the third such body conversion we've come across in recent months (see "Virtual Reality" elsewhere in this issue for details). This particular body kit, developed by Dan Gueths (pronounced "geetz," thus the name for the kit), is mounted on an '81 Corvette with a functional roof panel. Convertible and coupe mod-



els are also available. Gueths says the kit's 12 fiberglass panels can be fitted on '68-'82 'Vettes in as little as 40 hours. These model years are the least expensive for use as donor cars and the simplest mechanically. Stock parts that are retained in their original locations include the windshield, bumper braces, gas tank, cockpit interior and roll-up side windows. After installation, the black-gelcoated panels must be prepped and painted. Also included in the kit price of \$8995 are the lights, brackets, hinges, inner-fender extensions, bonding strips and hardware. The installation charge is \$5995, and turn-key vehicles start at \$25,995. For further details, contact dealer Bill Hamilton at 608/884-8290.

WARNING:

DO NOT BUY OR BUILD ANY KIT CAR UNTIL YOU READ THIS PAGE!

Don't waste \$5 to \$10 for each manufacturer's information packet. Read the following first. It could save you thousands of dollars.

Knowledge is Power!

Corey Rudi, the owner of two kit car companies since the age of 17, has seen too many good people take 2 years instead of 2 months and budget \$10,000 but spend \$30,000 to complete their kit car. Not because they're stupid, but because they do not have the experience, inside tips and secrets, and costly knowledge it takes to build a kit car with the least expense. Corey became so frustrated with this situation that he decided to show you how easy it is to avoid all the pitfalls and aggravation, but best of all, he shares all his kit car secrets with you in his new book called *Secrets of Buying & Building Your Specialty Car on a Small Budget*. It contains facts you will need if you are building a kit car.

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- Master any assembly procedure you desire
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- 52 of the hardest-hitting building tips
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Purchasing the right kit and dealing with the right manufacturer will save you thousands of dollars, and we'll show you how.



Don't let the title fool you... This book is 102 (8.5 x 11") pages of pure dynamite. You are not going to build a cheap, substandard car from this book. But you will get the inside's scoop on how to build the top-notch kit car of your choice for the lowest cost humanly possible.

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- Get your car assembled absolutely free
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You will learn the above and much more with super-simple, easy-to-understand techniques.

It doesn't matter if you are looking for a kit or turnkey car, presently assembling one, or have completed your kit; the information in his book will save you thousands of dollars! Some of his techniques, tips and secrets are revolutionary and worth a small fortune! Many of them apply to any car, not just your kit car.

This book has been widely praised by the Specialty Constructed Vehicle Association, The Complete Guide to Specialty Cars, Kit Car Magazine and Kit Car Illustrated.

Here's Proof!

"As my project forged ahead, my dream machine was turning into a nightmare. It was looking like my car was going to cost me \$35,000 instead of the \$18,000 I budgeted. Then I met Corey; his tips and secrets got me out of my predicaments and I ended up building my car for less than \$15,000." Wesley White, Merickville, Ontario

"We experienced car buffs will even gain some valuable tips. There are not too many books out there that deal with our specialty car hobby, so when a good one comes along, we need to grab it!" Oklahoma Kit Car Club

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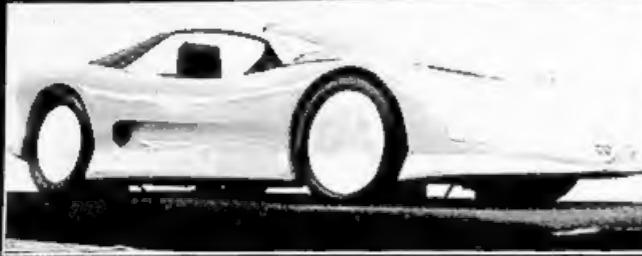
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SPECIALTY SCENE

RIOT ENSUES

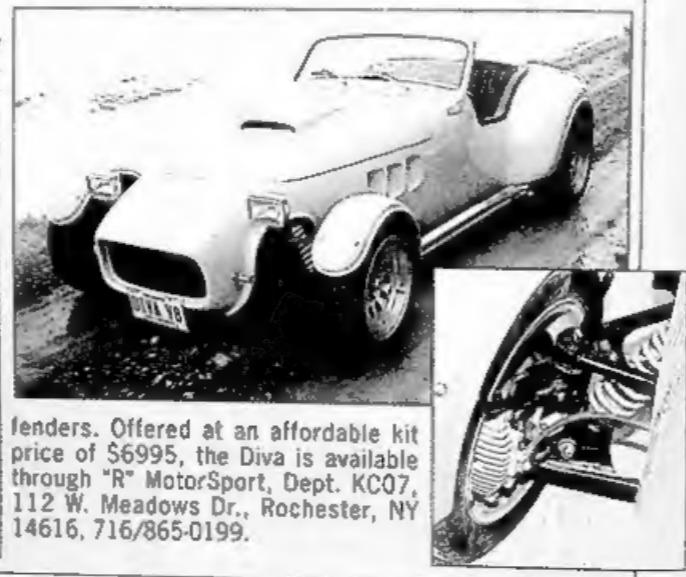
If you were as frustrated as we were over the stillborn Riot (see "Back to the Future," September '94), it appears that Tom McBurnie, known for his Daytona Spyder conversion of the Corvette seen on *Miami Vice*, plans to complete this project under his new company, Thunder Ranch (Dept. KC07, 1468 N. Magnolia, El Cajon, CA 92020, 619/659-9245). McBurnie also has a mid-engined street rod called the Lightning (so named for its super-light all-composite construction). Like so many kit cars of



the days gone by, the Riot will use the undying Volkswagen Beetle chassis but with some significant differences. The VW pan will not have to be shortened (allowing the Riot to be registered and insured as a Volkswagen), and the body has a tubular-steel sub-frame for increased chassis rigidity. According to designer Adrian Corbett, who also produced the Patriot Fiero conversion, only '69-'75 Bugs with the independent rearend are suitable for the transformation. A wide range of options are planned so that the \$3650 base kit can be personalized.

DIVA SINGS

Although reminiscent of the Lotus Super Seven, the new Diva Roadster's beefed-up bodywork creates a more muscular look in keeping with its hot rod mechanicals. Under the hood scoop is a Chevy 350 backed up by a TH350 automatic transmission and a Ford 8.8-inch live axle with disc brakes. At the front are Mustang II pieces with Corvette calipers, custom aluminum hubs and cycle-type



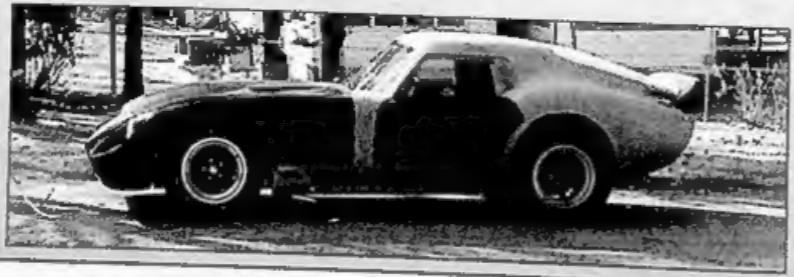
fenders. Offered at an affordable kit price of \$6995, the Diva is available through "R" MotorSport, Dept. KC07, 112 W. Meadows Dr., Rochester, NY 14616, 716/865-0199.

SWEEPSTAKES WINNER

If you think no one ever wins those big giveaways, think again. More than 150,000 readers of *Hot Rod*, *Rod & Custom* and *Kit Car* magazines took a chance, but Herman L. Mitchell of Knoxville, Tennessee, came up the lucky winner of Petersen's '32 Ford Kit Sweepstakes. The Ford Roadster kit includes a California Street Rods stage-II frame, a Chevy 350 motor, a Ford 9-inch rearend and components from Carrera, Ron Francis', BFGoodrich, Currie Enterprises, Billet Specialties, Posies and many others.

DAYTONA DREAMS

Bob Schumacher of Omaha, Nebraska, sent us some snapshots of a Cobra Daytona Coupe replica he's developing. Starting with a Shell Valley Motors frame, he created body molds from a 6-inch scale model blown up in size with a micrometer and calculator. He plans to offer a kit later this year, with prices undetermined as of this writing. Contact: R&D Design Concepts Inc., Dept. KC07, 9536 Military, Omaha, NE 68134. **KC**



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PHOTOGRAPH: LYNNE MCREADY/PPC PHOTOGRAPHIC & STEVE TEMPLE

By Steve Temple

Never we ached for a new kit in the works, this is it. Over a period of more than six months, we watched the mold plug for Warlock's Phantom VT take form at an agonizingly slow pace. Countless hours of sculpting, shaping and sanding went into this ground-up creation. "Is it done yet?" and "How soon, how soon?" were the frequent questions we asked the newly established Warlock Designs. We knew the fledgling company could readily craft this new Fiero conversion because the principals of Warlock are experienced rebody builders, especially of the exotic type. Their proven level of craftsmanship stirred our anticipation all the more.

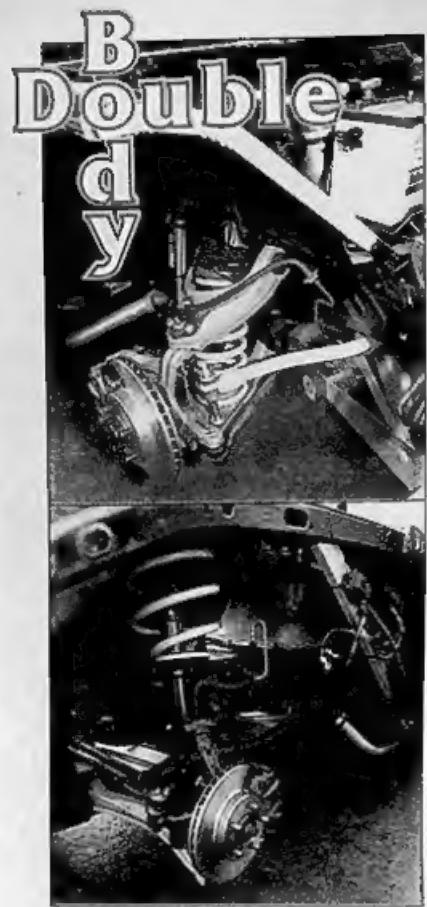
When we saw the first bodies out of the mold, we realized we had grossly underestimated just how good this new kit could be. What's especially surprising and a boon to the kit assembler is that the main body is virtually all one piece and color-gelcoated, simplifying the assembly process. What you see before you are the first photos of it installed on a stretched Fiero chassis, shown here exclusively in *Kit Car*. You be the judge. Is this great or what?

The projected price of the kit version is \$17,000, at least twice the going rate for most Fiero rebodies, but there's a lot more to this project than your average reskin. As mentioned, you get a one-piece body for easy installation, reinforced with glassed-in steel tubing. Since the body comes in your choice of

B Double Body



**The Phantom VT's
Allure Is More Than
Skin Deep**



Suspension mods include heavy-duty sway bars, larger vented brake rotors, lower coil springs and new shocks.

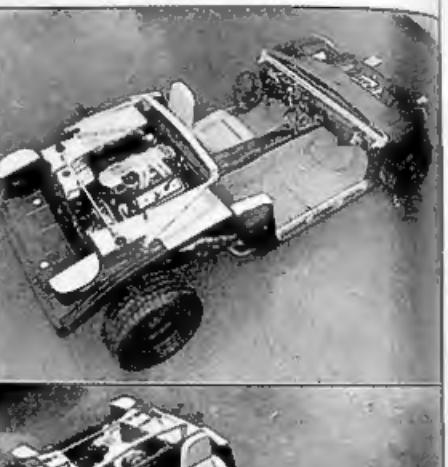


16 KIT CAR

color gelcoat, you don't have to factor in the costs of prep and paint. The doors and the lids must be installed by the assembler, but Warlock also offers partially assembled body packages if you'd rather pay to have that work done. The kit also includes a DOT-stamped windshield and curved side-window glass. Hard-to-source parts such as pop-up headlight mechanisms and light covers are included, as are a molded fiberglass dash, a console, an instrument cluster and frame-reinforcement plates. Turn-key vehicles with stock Fiero drivetrains start at \$39,000.

We'll be the first to point out that the car you see here is not done yet, but it's close—so close. Stay tuned for further features on the fit and finish and how the car drives. You see, Warlock has something extra in

mind besides the alluring body kit. Not only is the Fiero frame lengthened 11 inches, but there will also be an option for a totally new type of V8 conversion. Most engine swaps in Fieros require a transverse mounting, but Warlock has developed a package that mounts a fuel-injected 345hp Chevy 350 longitudinally using a reworked transmission from a Porsche 914. Warlock says the guts of the tranny will be completely redone with different gear ratios to properly divvy up the powerband. A turn-key car with this new type of V8 swap costs \$49,900. Numerous frame reinforcements, brake upgrades and suspension mods will also be incorporated into the Fiero chassis to handle the prodigious increase in power. The beauty of this rebody will definitely be more than skin deep. **KC**



Numerous modifications are required on the Pontiac Fiero donor car. Not only is the frame elongated 11 inches, but it must also be reinforced prior to cutting off the roof. Although a stock Pontiac drivetrain can be used, Warlock also has a longitudinal V8 conversion in the works.

Additional frame reinforcements are welded in behind the cockpit and across the dash.

The TPM Chevy 350 requires an adapter plate to mate with the Porsche 914 transaxle. To handle the greater torque loads, the clutch and gearset will be completely reworked. Note the frame reinforcements above the engine and beneath the gearcase.

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Warlock Designs, Inc.
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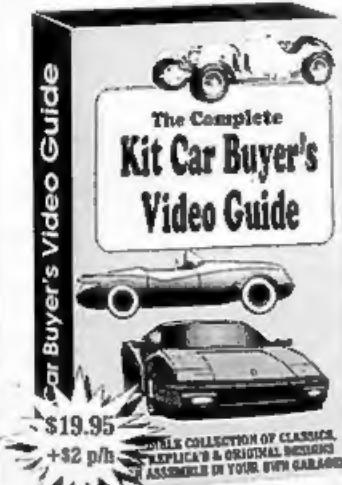
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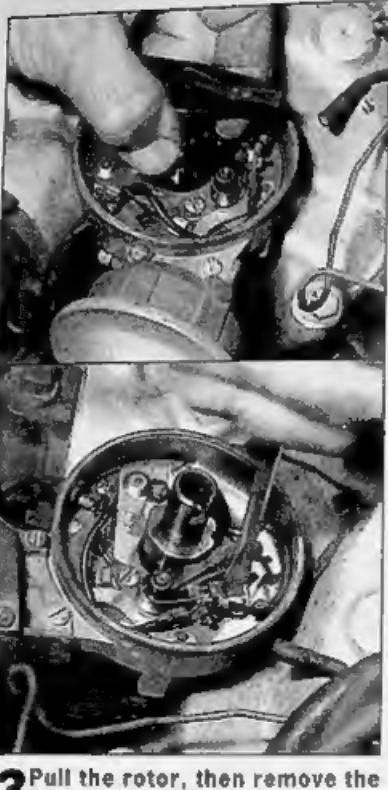
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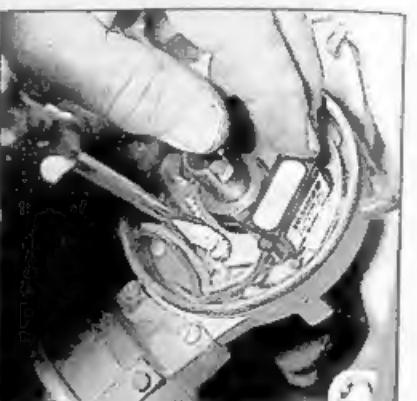
1 The Ignitor kit is simple in scope and easy to install.



2 Ford's single-point distributor is equally simple in scope. The Ignitor kit from Pertronix replaces the points and the condenser and promises improved performance.



4 The lead from the original ignition coil to the breaker point is removed next.



5 Feed the wires through as shown and install the Ignitor assembly. Set the air gap (between the Ignitor module and the rotor to be installed) to .030 inch.

The Point Is...

No Points at All With the Ignitor From Pertronix

By Jim Smart & Fred Buring

The weakest link in older Ford performance donor vehicles is the outdated, point-triggered ignition system. Stand by the exhaust pipe and listen to the putt-putting of an occasional misfire. Push down on the accelerator on a hill and wait for the torque. Pull the distributor cap and wiggle the shaft plagued by bad bushings. The ol' girl just isn't cutting the mustard, and tune-ups just don't seem to last as long as they once did.

If your kit car's vintage Ford engine needs perpetual tune-ups, Pertronix has the answer—and it fits neatly inside of your Ford distributor. Pertronix claims that its Ignitor is good for up to 20 additional hp for under \$100. The Ignitor has been proven in fleet use with more than 750,000 sold.

18 KIT CAR

Based on that information and the claim of easy installation, we had to check out the Ignitor for our '68 289-2V engine. (The unit is designed to work on big-block and other engines as well.)

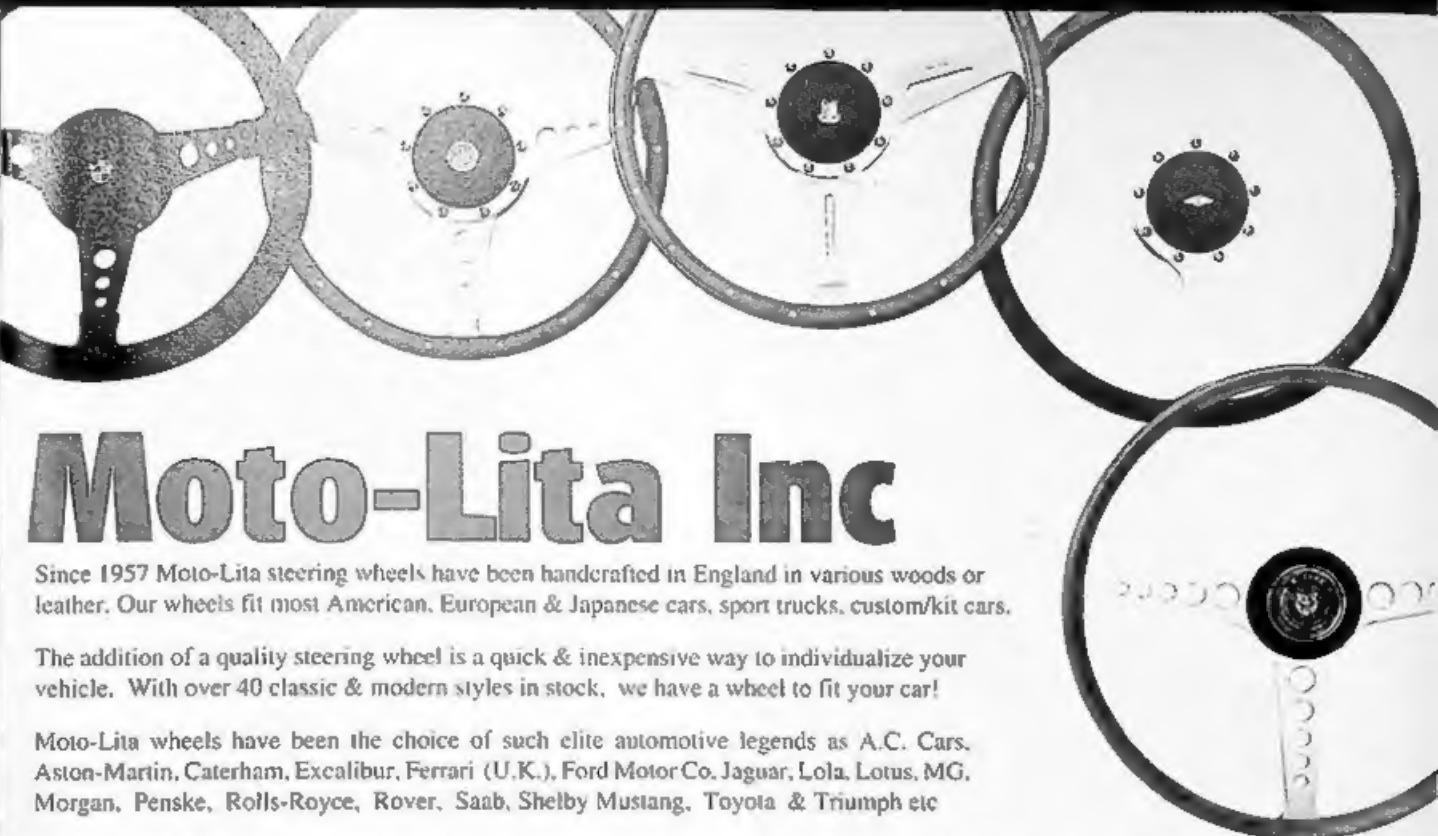
Our donor car was a daily L.A.-freeway warrior. We're talking more than 20,000 miles annually on Southern California superslides. With a point-triggered distributor, this mileage translated to at least two tune-ups annually because points and rubbing blocks simply wore out. We installed the Ignitor in roughly 30 minutes (other ignition items were shot, such as the spark plug wires, the distributor cap and the plugs themselves). We performed a complete tune-up and carburetor adjustment to complement our Ignitor installation. Don't forget to set your ignition timing and air/fuel mixture for the best performance. **KC**



6 With some remanufactured distributors, the aftermarket system uses a longer breaker-plate support pivot. This pivot will interfere with the reluctor. It must be shimmed using two flat washers underneath, which will lower the pivot height and clear the spinning reluctor.

SOURCE
Pertronix, Inc.
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PHOTOGRAPHY: JIM SMART



Moto-Lita Inc

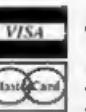
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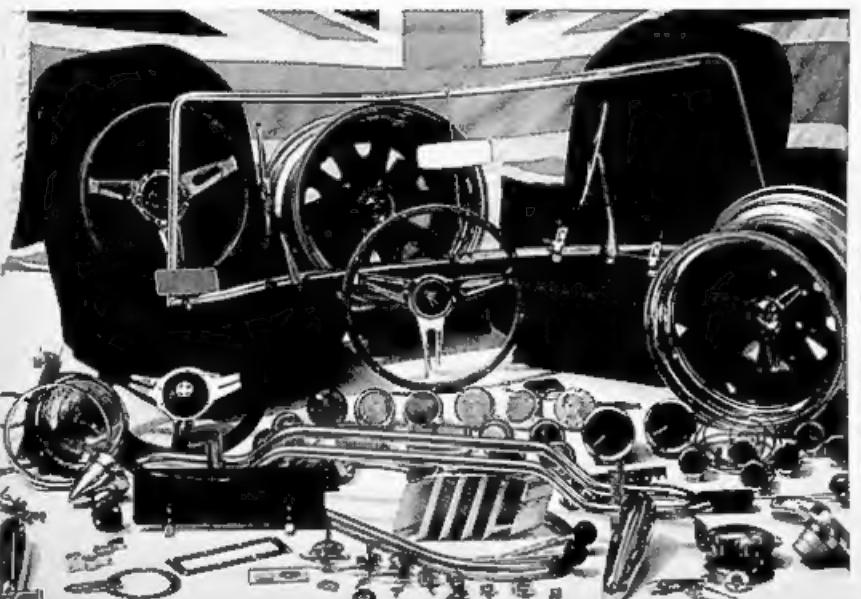
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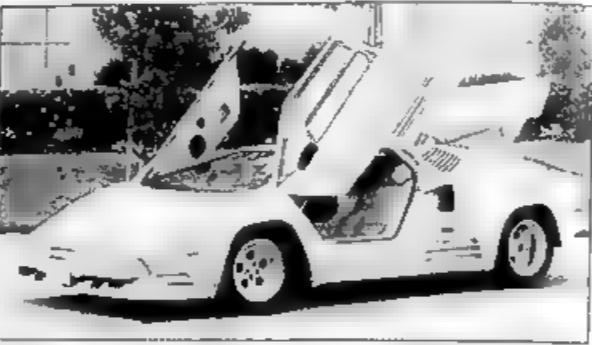
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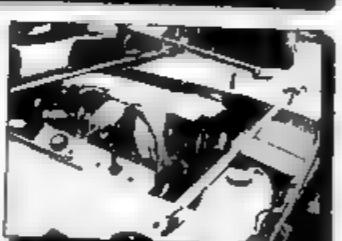


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HOW TO WORK WITH

GLASS



Tech Tips on Materials, Prepping and Repairing

It's not something you really want to do. It's sticky and smelly, and once it sets up and you start grinding, gritty and dusty. Yet working with fiberglass is something every kit car enthusiast needs to know about because 99.9 percent of all kit bodies consist of catalyzed resin and glass fibers.

Now many *Kit Car* readers are great at wrenching on a Ford 9-inch rearend or fine-tuning Webers, but how many of you

are really up on this weird science of fiberglass? If you are, you're 10 steps ahead of the game in building and maintaining your kit project. But if you're not, read on, because we've got a whole bunch of simple solutions for fixing fiberglass.

In researching this article, we spent a lot of time breathing in styrene fumes at various kit car manufacturers and also sought the expert advice of Tom Bellaw, who's an instructor on the subject. We've got something for everybody here, from the materials and tools you'll need to tips on prepping for paint and repairing the gelcoat and cracks. So strap on your dust mask and pull on those rubber gloves, and let's get busy.

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6. BODY FILLER
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9. MOLD-RELEASE WAX
10. DUST MASK
11. RUBBER GLOVES
12. RESIN BRUSH
13. FOAM WAXING PAD
14. COLOR GELCOAT
15. DUST SUIT
16. COMPOUND BODY MOLD
17. PLASTIC SPREADER
18. SPRAY FILLER

PHOTOGRAPH STEVE TEMPLE, TOM BELLAW & ERIC RICKMAN

HOW TO WORK WITH FIBERGLASS

Materials, Tools & Methods

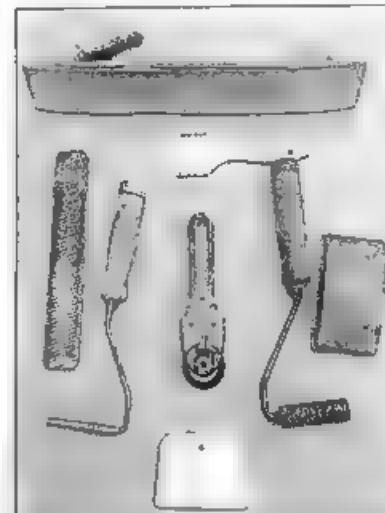
By Tom Bellaw & Steve Temple



Here are most of the chemicals you'll ever need to work with fiberglass. If you don't know where to locate these sorts of supplies, look in the local phone book under fiberglass materials and boat repairs or try a paint and body store.

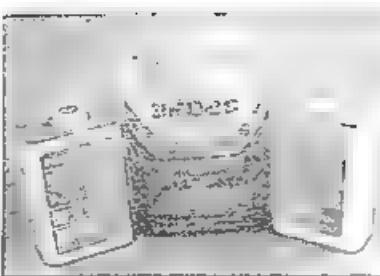


Resin and hardener are the two liquids mixed together and applied to the glass fibers. The small bottle of methyl ethyl ketone (MEK), also known as organic peroxide, can catalyze the entire 1-gallon container of resin. Typically a resin-to-hardener ratio of 100:1 is about right, but hot and dry weather will "kick off" a resin mixture more quickly and thus slightly less hardener may be needed.

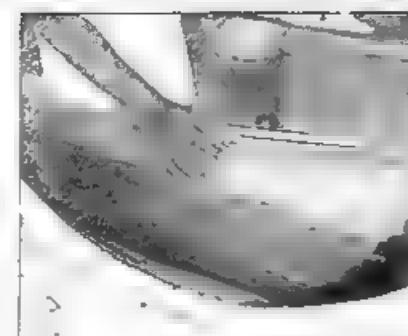


These are some of the typical tools used in applying and shaping fiberglass. A roller knife (or a pair of scissors) is for trimming dry fiberglass cloth before layup. (Don't use a utility knife to cut dry cloth because it will tear.) A simple paintbrush will work for wetting out cloth with resin, but rollers of varying shapes and diameters are required for pressing the glass fibers into corners and eliminating air bubbles. A plastic spreader is necessary for a smooth application of body filler. Once it sets, cheese graters and board and block sanders take the layer of filler down to the level of the adjacent undisturbed surfaces. Air-powered drills and orbital sanders are a better choice than electric tools because of the great amount of dust involved in this type of work, and they are safer when working with the volatile chemicals required for fiberglassing.

PHOTOGRAPHY STEVE TEMPLE & TOM BELLAW



Acetone, lacquer thinner and denatured alcohol are primarily for cleaning tools. Acetone and thinner can also be used to reduce the consistency of gel-coat for easier spraying, but alcohol is not recommended for this purpose. Of the three, acetone does the best job and is normally the cheapest, but take care to follow the safety precautions on the label.



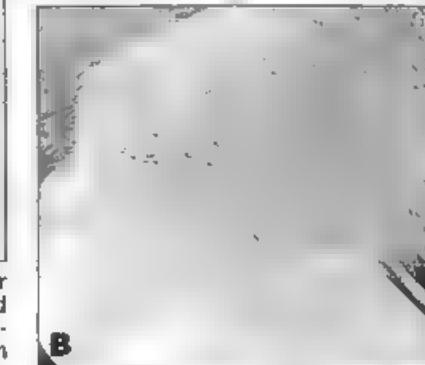
Mold-release wax prevents catalyzed resin from sticking to the mold. It can also be used to protect surrounding body surfaces when you have to build up the edge of a door or lid to fill in gaps.



Plastic body filler and cream hardener (often referred to by the brand name Bondo) is a versatile material that can be used in a wide variety of applications. Although not suitable for structural repairs, it is ideal for smoothing out imperfections or shaping a plug in the development of a mold. You simply mix the filler and hardener together with a putty knife and spread the compound on the body part.



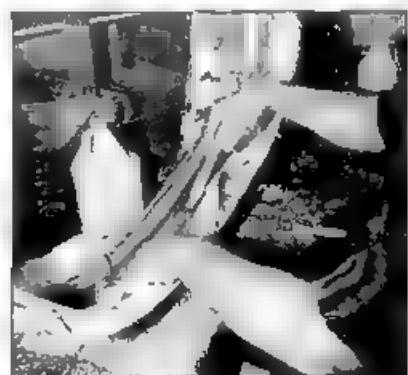
Gelcoat (sometimes spelled gel-coat or gel coat) is the outer color layer found on finished fiberglass. Many kit car bodies have this instead of paint, which requires different repair and maintenance methods. It can be purchased in a multitude of colors and then tinted with dye to the desired hue. Gelcoat must be sprayed on with either a professional spray gun or, for the home user, a "cup gun" (see "Repairing Cracks and Gelcoat" in this section). The air compressor should pump at least 13 cubic feet per minute at 125 psi. It should also have 60 gallons of storage capacity. Check your local emissions laws before proceeding because you may need to rent a spray booth.



Polyvinyl acetate (PVA), a water-and-alcohol-based product, is a fool-proof release agent. It can be used in conjunction with mold-release wax when laying up a part or when repairing gel-coat. PVA is cheap and ensures high-quality results.



Glass fibers come in several types and weights. Cloth is a woven material (A), and matte has randomly oriented fibers held together with starch (B). In some cases cloth and matte are combined in a single fabric (C) to take advantage of the properties of each. Cloth is usually stronger, but the matte wets out and bonds more easily to other layers and doesn't usually have the problem of cloth transfer (where the weave prints show through to the surface). Coremat, a spongy layer of cloth shown in the opening color photo on page 21, can be used to minimize cloth transfer and increase panel strength.



Hand layup (or handlaid fiberglass) is simply that—resin and fiberglass applied in a mold by hand. A chopper gun sprays chopped strands of glass and catalyzed resin onto the mold surface. Which is better? That depends greatly on the person doing the job. Generally, a handlaid body gets more personal attention, but if the cloth is not rolled out properly, air bubbles can still be a problem. An experienced chopper-gun operator can produce a quality product, but care must be taken to ensure a smooth and even application.

HOW TO WORK WITH FIBERGLASS

Prepping for Paint

By Jeff Tann

Many kit bodies come color-gelcoated and require no paint, but if you want a more personal look with stripes, flames, custom colors or whatever, you've got to squirt it on. Fiberglass requires slightly different methods and materials than sheetmetal. The trick is to prep the body properly and use the right primers, otherwise, you'll get air bubbles or the paint may not

stick. Even if a primer coat is already on the body, you should still carefully scrutinize the surface for minor imperfections that may require body filler.

Again the key to success is thorough preparation. The Minotti '34 Ford Coupe body shown here had a shiny black gelcoat and required only minor prepping. Even so, figure on at least a couple of weekends to do the job right.

1 Before any sanding was done, we wiped the body down with PPG/Ditzler Wax and Grease Remover to get rid of any fiberglass-release agent. The mold seams were smoothed out with 80-grit sandpaper wrapped around a hard-rubber sanding block. Areas around the doors and the lids may need to be built up slightly to fill in gaps, as seen here on the cowl area. First, apply mold-release wax on the adjacent panel and position it in place, then add filler to build up the body.

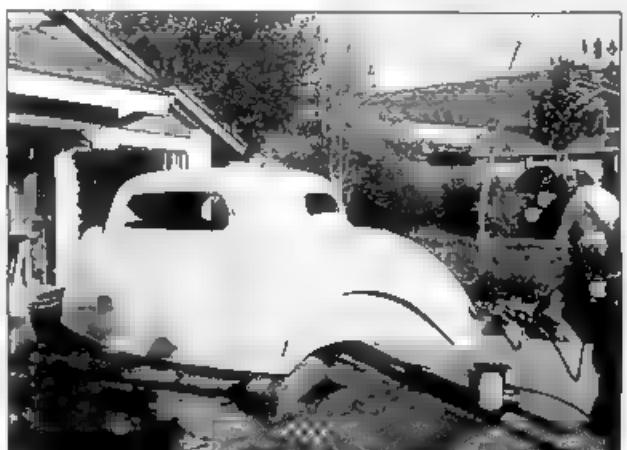


2 A close inspection of the body revealed pinholes in the filler that required fixing (A). Evercoat Polyester Glazing Putty (B) is designed to fill small imperfections such as air holes, chips and dings. It requires mixing with a catalyst and will dry quickly. We applied a thin coat, and it was dry to the touch and ready for sanding in about 15 minutes (C). We sanded the area with 220-grit wet-and-dry sandpaper and the holes were gone (D).

PHOTOGRAPHY: JEFF TANN



3 Fiberglass should be sealed before it's painted to prevent any strange reactions. The best way to do this is to apply a durable epoxy primer such as PPG DP 74. The primer also has etching properties, so it sticks to the surface and provides good adhesion for paint. Apply several coats of primer to the body to cover any remaining small imperfections. This primer is so effective that it's almost like another layer of gelcoat. Be sure to wear a respirator and spray in a well-ventilated area.



4 Allow the body to dry for 24 hours, then sand it with 320-grit wet-and-dry sandpaper. The final primer/sealer coat requires another catalyzed primer, PPG K 200. It is tan and can be sanded for an extremely smooth finish. It's recommended for use under urethane paint. It goes on smoothly and is easier to sand than the DP 74. We applied four coats for good coverage and to have plenty of material for sanding with 400-grit wet-and-dry sandpaper.



SOURCES

Minotti's Fiberglass Products, Inc.
Dept. KC07
1981 J&C Blvd.
Naples, FL 33942
813/592-6010

PPG Finishes
Dept. KC07
19699 Progress Dr.
Strongsville, OH 44136

5 The final paint finish was done with PPG Basecoat/ Clearcoat in Poppy Orange with gold pearl. The paint went on easily with no problems. The same process was used on the fenders, doors and lids. After drying, the body was color-sanded and buffed to a high gloss.

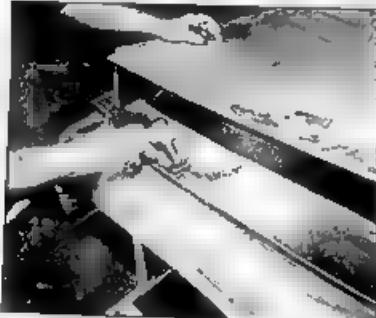
HOW TO WORK WITH FIBERGLASS

Repairing Cracks and Gelcoat

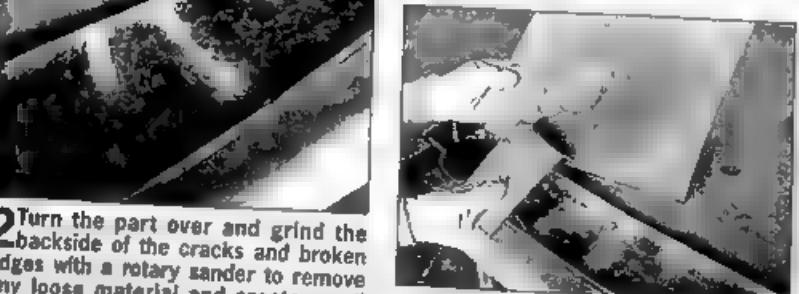
By Steve Temple



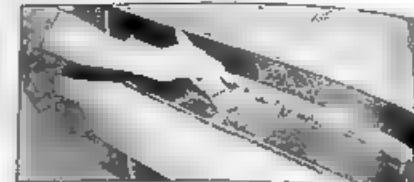
1 Whether a piece of bodywork is broken in two or cracked (this rear wing has both types of damage), the approach is pretty much the same. If possible, remove the part from the body to simplify repairs.



2 Turn the part over and grind the backside of the cracks and broken edges with a rotary sander to remove any loose material and create small grooves. Also, roughing up the surface helps the repair patch adhere to the surface.



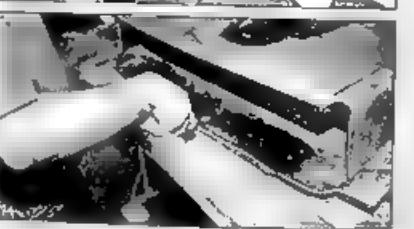
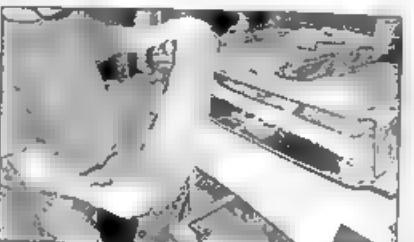
4 Prior to applying the patch, add milled fiberglass (microballoons or talcum powder will also work) with resin and catalyst to make a thick putty, then fill in the grooves. Without this resin putty (don't use body filler, which can crack), the resin may drip through or an air pocket may develop.



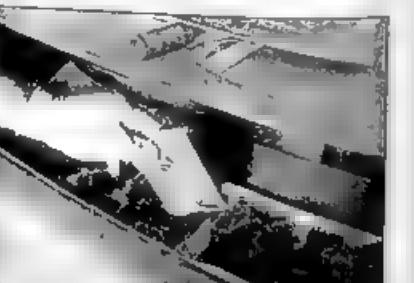
5 After the resin putty sets, mix a batch of resin and catalyst (10:1 ratio) and apply it with a paintbrush over the area the fiberglass matte will cover.



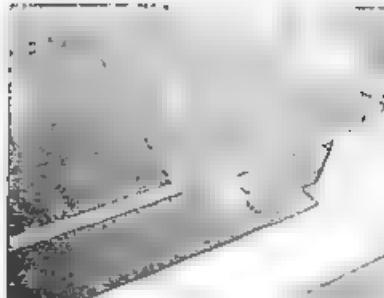
6 Lay the matte on some paper and wet it thoroughly with the same resin mixture. You may also need to use a roller for complete saturation.



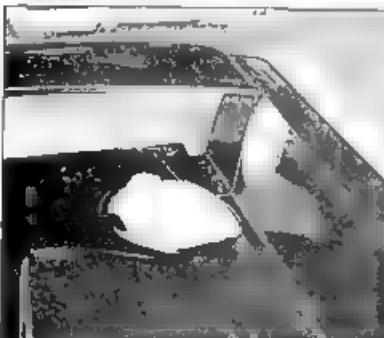
7 Be sure to wear rubber gloves. Carefully pick up the wet matte and lay it on the repair area. Gently roll out any air bubbles.



11 Apply plastic body filler to the damaged area with a plastic spreader.



8 Allow the patch to set for at least an hour before prepping for paint or repairing the gelcoat.



9 Gelcoat damage ranges from large abrasions, such as on this rear decklid, to small scratches or crazing (fine spiderweb cracks). Sometimes the latter can be fixed simply by rubbing the damaged area with 220-grit wet-and-dry sandpaper, unless the crack is too deep or the gelcoat too thin.



10 Begin by sanding the damaged area to remove any loose material and even out the surface.



12 Block-sand the area with 40-grit paper, then use increasingly finer grades up to about 220 grit. Use your fingertips with only the fine grades of paper to feel for imperfections. Note the extra area sanded around the damaged section. It's important to overlap the undamaged gelcoat so the patch adheres and blends in properly.



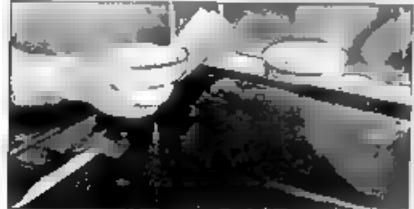
12 Block-sand the area with 40-grit paper, then use increasingly finer grades up to about 220 grit. Use your fingertips with only the fine grades of paper to feel for imperfections. Note the extra area sanded around the damaged section. It's important to overlap the undamaged gelcoat so the patch adheres and blends in properly.



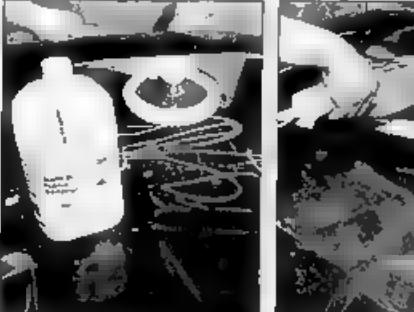
13 You'll need a cup gun and an air compressor to spray the gelcoat. Mix the gelcoat and catalyst in the cup.



15 Clean out the cup gun with acetone, then spray on a layer of parting film, also called polyvinyl acetate (PVA). This step is very important because the PVA seals the gelcoat so that it dries thoroughly.



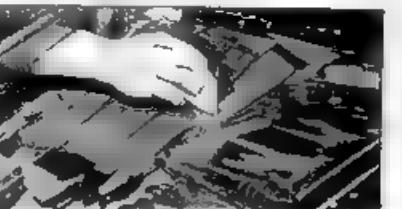
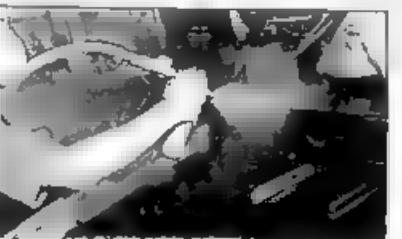
16 After the gelcoat has dried for at least a few hours, wash off the PVA with water. Then use water and 220-grit wet-and-dry sandpaper to smooth the repaired area down to the level of the surrounding gelcoat. Work up to 1000-grit paper to remove any sanding marks. Use a rubber squeegee to remove excess water and determine the smoothness of the finish.



17 The final step is to apply some rubbing compound and buff the area with a soft pad. KC



14 Spray on a generous amount of gelcoat because you'll be sanding it down to match the surrounding surfaces.



SOURCE
Imaginary Fiber
Glass
Dept. KC07
15740 El Prado Rd.
Chino, CA 91710
909/597-4110

M&M's New Vettper has the Looks Without the Limits

VIRTUAL REALITY

PHOTOGRAPHY JIM YOUNGS

By Jim Youngs

Roadsters are great and a lot of fun, but there comes a time in most parts of this country when you have to put them away for the winter. When budget realities and a desire to drive in all kinds of weather dictate something more practical, well, hey—how about a car that just happens to strongly resemble that overpublicized reptile, but with a T-top and roll-up windows? Sure, M&M's Vettper may not have the torque a V10 pumps out, but doesn't a late-model TPI 350 Chevy provide enough punch to cause gluteal clench? Maybe this

The stock Corvette's side windows and windshield are all retained, so the T-top is still functional even with M&M's radically different body panels

reptile replica won't hit 0-60 mph in four seconds, but it doesn't cost \$55,000 plus dealer add-ons and \$4400 in luxury and gas-guzzler taxes. What the Vettper will give you is an affordable virtual reality experience, with better protection from the elements and room for performance improvements all nicely wrapped with those eye-popping plastic panels

Working with highly sophisticated and amazingly intricate molds, M&M offers an assortment of hand-laid-fiberglass replacement body panels to transform '84 and newer Corvettes into the resplendent Vettper you see before you. The bonus is that the transformation isn't too challenging, nor does it require much alteration to the donor car. For \$6000 the basic kit includes front and rear bumpers, a pair of door skins and front and rear clips. The company offers most of the remaining required components as optional accessories. Included are the door handles, various brackets, wheel spacers and fake side-pipe rocker panels. In addition to those components, you will have to visit a Chrysler parts outfit for appropriate front- and rear-light assemblies.

Other than removing the donor car's body panels (which can usually be sold for a handsome sum to defray project expenses), the only alteration to the stock Corvette is lowering the gas tank. M&M has the bolt-on brackets to achieve the alteration, and the filler neck stays in the same location, exiting the body where it does on the Corvette. M&M also retains the electric radio-antenna location in the changeover. Everything else on the donor—the interior, windshield, engine, electrical system, instruments, suspension and doors—remains untouched. Even adding the new body panels is straightforward, since they attach to existing components.

After the Corvette body is removed, fiberglass components such as the rear clip simply align with the rear doorsill. Parts are screwed, riveted or bolted in place to line up with

existing Vette parts, and some bonding and filling is necessary for permanent attachment and smoothing.

We've already mentioned the all-weather nature of this look-alike. M&M has designed the rear hoop so that the stock T-top attachment points are not altered. The windshield is also original equipment, so the T-top remains operational. The rear window is a standard piece as well, as are the electric roll-up windows. Yes, the resulting shape is slightly different from the real car, but not startlingly so, and you can drive it on rainy days in cozy comfort. Or you can open up the cockpit completely for those dog-day jaunts.

With several kits coming along that resemble the Dodge Viper, perhaps a little comparison is in order. We have also checked out Automotive Affair's Vortex (see "The Price is Right," March '95). The two cars are quite different in appearance, execution and what's required to build the kit. Both cars are designed to fit '84 and newer Corvettes. We've already touched on the biggest difference between the Vettper and the Vortex: the retention of the stock windshield and the T-top arrangement on the Vettper. The Vortex requires removing the stock windshield and using front glass supplied by Automotive Affair (AA). AA has also fabricated a new gas tank, but Vettper relies on the stock fuel container.

Since the bodies on these kits are wider than the Corvette's, they require spacers to move the wheels outboard to the edge of the fender lips for a proper stance. Keep in mind that wide wheel spacers change the relationship of the wheel to the axle, so some assistance from a professional alignment shop may be required.

The two cars also differ in the side-pipe treatment. M&M opted to mold faux pipes into the rocker panels and leave the donor car's exhaust system untouched (the company is developing an option to route the pipes out the side). Automotive Affair chose to incorporate working side pipes with



The front and rear lights are from the original reptile

an elaborate routing of flexible exhaust tubing, which doesn't disturb any of the exhaust emissions gear. With a bit of ingenuity and custom fabrication, the M&M treatment could be altered to allow for live side exhaust. One final difference between the two cars was that the Vettper's doors open wider than the Vortex's.

M&M built this prototype Vettper in about three weeks on a slightly damaged '86 Corvette purchased for \$6000. Everything on its car is stock, including the 275/40-17 front tires and 335/35-17 rear rubber. It's obvious that the paws were mounted on O.E.M. wheels minus the caps, which mysteriously disappeared from the shop before our photo session. The interior is also stock but doesn't have to remain so, since there is an abundance of aftermarket products to transform the cockpit into something special. M&M is also considering some upgrade items in its ongoing development of the car.

What a shame it is that some of our favorite cars have to spend a great deal of the year out of the weather collecting dust in the garage. It doesn't have to be that way, of course, at least as it applies to a certain celebrity roadster. The Vettper gives you the look without the limits. **KC**

SOURCE
M&M
Dept. KC07
531 NW 1st Ave.
Ft. Lauderdale, FL 33301
305/467-1627

SNAPPY DRESSERS

Here's the Latest in Accessories to Outfit Your Kit

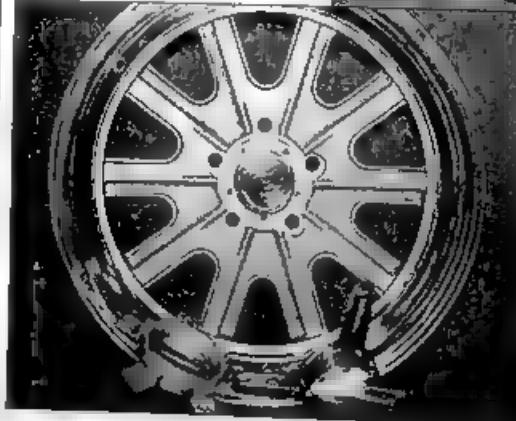
By Paula Ross

Accessories—gadgets, gewgaws, car jewelry, bolt-ons, gingerbread, whatever you call 'em—they're the details that make the difference between a bare-bones project and a showpiece. Whether you're putting the finishing touches on a current project vehicle or breathing new life into an old favorite, something as simple as a new steering wheel or even a Le-Mans-style gas cap can make all the difference. Add up several items such as those featured below, and you'll have a kit car that's impeccably dressed, inside and out.

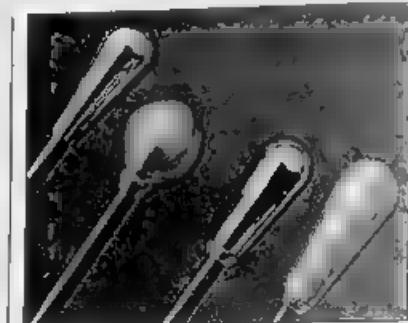


SPEAKER OF THE HOUSE

Even if your kit is as authentic as they come, the sound system needs '90s technology. Coustic has added two 4x6-inch high-performance two-way speaker systems to its lineup. The HT-623v is a flat-plate-component design that handles 70 watts per channel with a separate 3½-inch midrange and a ½-inch tweeter assembly. The HS-46v offers 60-watts-per-channel handling capability and 89dB sensitivity. Coustic, Dept. KC07, 4260 Charter St., Vernon, CA 90058, 800/227-8879.

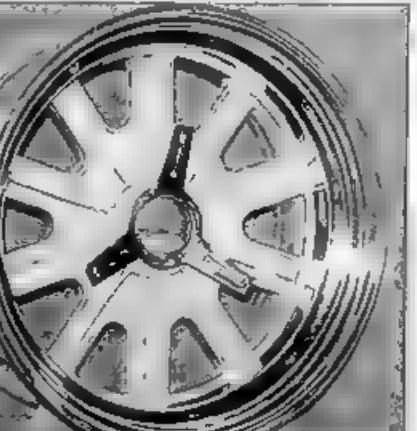


including the deep backspacing required by a Cobra with a Corvette suspension. Currently the wheels are offered in 15- and 17-inch diameters. The precisely machined center section is cast 356-T6 aluminum, so the wheel's total weight is only 20 pounds. Cobra Manufacturing, Dept. KC07, 12 NW 1st Ave., Dania, FL 33004, 800/762-5365.



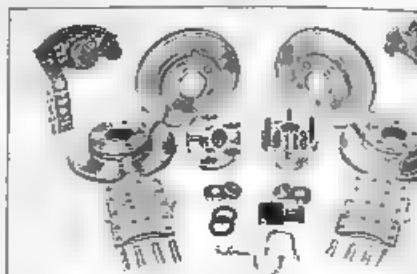
SLICK SHIFTING

Sola Gearshift's line of wood and billet gearshift knobs offers an anatomically designed detail that adds distinction to the interior of your vehicle. The alloy knobs are CNC-machined from 6061-T6 aluminum and are available in a variety of finishes, including hardwood, nickel, chrome, clear pearlescent and hard-anodized in contemporary colors. Sola Gearshift, Dept. KC07, P.O. Box 131, Edgewater, NJ 07020, 201/278-4411.



NEW KNOCK-OFF

Want that knock-off look on your Cobra replica but prefer the safety of a five-lug hub? Check out Cobra Manufacturing's new wheel. Drawing on more than 30 years of foundry and pattern-making experience, the company has created a special cap that conceals the lug nuts. An imitation spinner finishes things off, with no exposed rivets or heavy adapters. Virtually any offset is available.



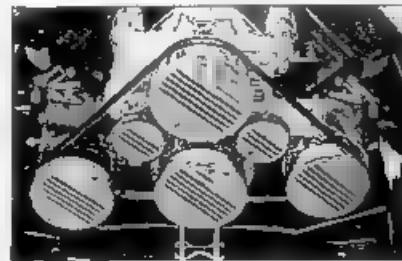
SPEEDY STOPPING

PISA—marketer of Artero, Scorpion and XTC/gt Fiero rebodies—now offers Speedway Brakes. According to PISA, this Fiero brake kit can be bolted on in less than four hours and provides more stopping power (reportedly only 121 feet from 60 mph) via large diameter pistons in the calipers. Large, fully vented rotors offer increased cooling for less heat-related brake fade. PISA Corp., Dept. KC07, P.O. Box 15088, Phoenix, AZ 85060, 602/376-5550.



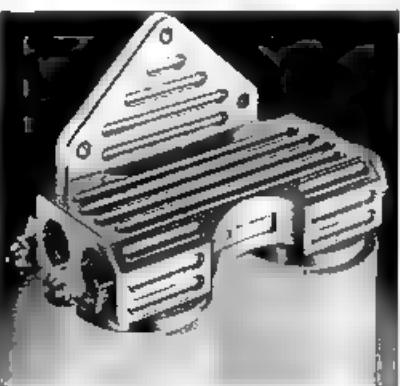
THE KINDEST CUT

Plastic, Plexiglas and Lexan items—such as headlight covers, taillight blackouts or Cobra windwings and sunvisors—are easily scratched. Safe Cut from The Wax Shop is an ultra-fine abrasive polish for removing those minor swirls and scratches. The product can also be used for removing minor oxidation from painted surfaces and removing water spots. The Wax Shop, Dept. KC07, P.O. Box 10226, Bakersfield, CA 93389, 800/323-9192.



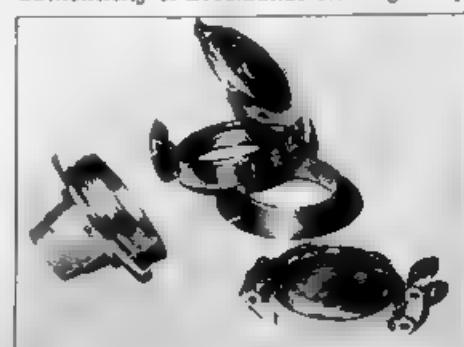
PRETTY PULLEY

A billet engine pulley will definitely dress up your vehicle, especially when the removable face is custom-machined to match a particular design (such as the pattern on your custom wheels). Clemmer's billet pulleys are available for regular- and serpentine-belt applications and include the crankshaft, water pump, A/C compressor, alternator, power-steering pump and, if necessary, idlers. Choose from a polished or satin finish on 6061-T6 aluminum. Clemmer's Rod Shop, Dept. KC07, 12209 NE 4th Plain, Vancouver, WA 98682, 206/253-6123.



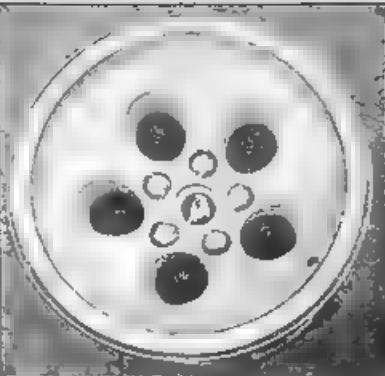
FILTER TIP

Penta Laboratories' billet remote filter adapter combines high style with the efficiency required of true racing components. Featuring high-flow passages, the Penta DFA-1 is machined from 6061-T6 aluminum alloy and is available for both AN-10 and AN-12 oil-line configurations. It can be blind-mounted or attached to a variety of chassis, firewall or inner-panel locations with an anodized bracket. Finish options include red, blue, purple or gold anodizing or natural silver. Penta Laboratories, Dept. KC07, 2111 Superior St., Chatsworth, CA 91311, 818/882-3872.



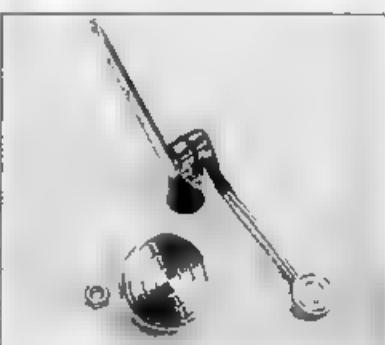
A TIP O' THE CAP

Owners of Cobra, MG and Jaguar D-type replicas will appreciate the authenticity of Brooklands' Aston gas cap, manufactured in England by the same company that has been making them for 40 years. The gas-filler cap is available in large (3½-inch internal diameter) or small (2½ and 2¾-inch internal diameter) and in both alloy and chromed finishes. Brooklands offers a high-performance roller version or a snap-shut style, plus two types of adapters. Brooklands, Dept. KC07, 1500 NW 62nd St., Ste. 503, Fort Lauderdale, FL 33309, 305/776-2748.



EXOTIC WHEELS

New from Lambo replica manufacturer Exotic Enterprises is a Countach-style wheel with a Fiero bolt pattern. Available in 15x8, 15x10 and 15x12 sizes, the aluminum wheel is a direct bolt-on application. Exotic Enterprises, Dept. KC07, 459 Madeline Ave., Garfield, NJ 07026, 201/956-7570.



ON TARGET

The StreetWorks version of the classic rubber Bull's-Eye brake pedal is 3 inches in diameter and comes with a ½-inch threaded stud and jam nut for installation. A matching chromed Bull's-Eye for the accelerator pedal measures 1½ inches in diameter. For a catalog, send \$3 to StreetWorks, Dept. KC07, P.O. Box 270, Bozrah, CT 06334, 203/859-0513.

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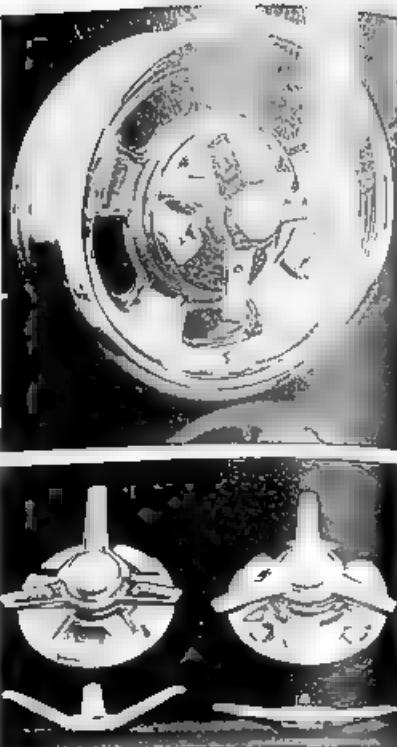
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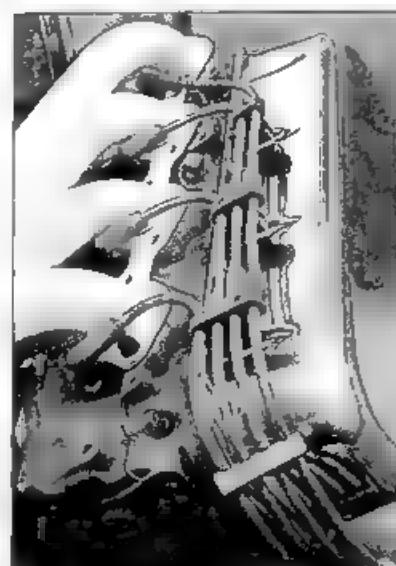
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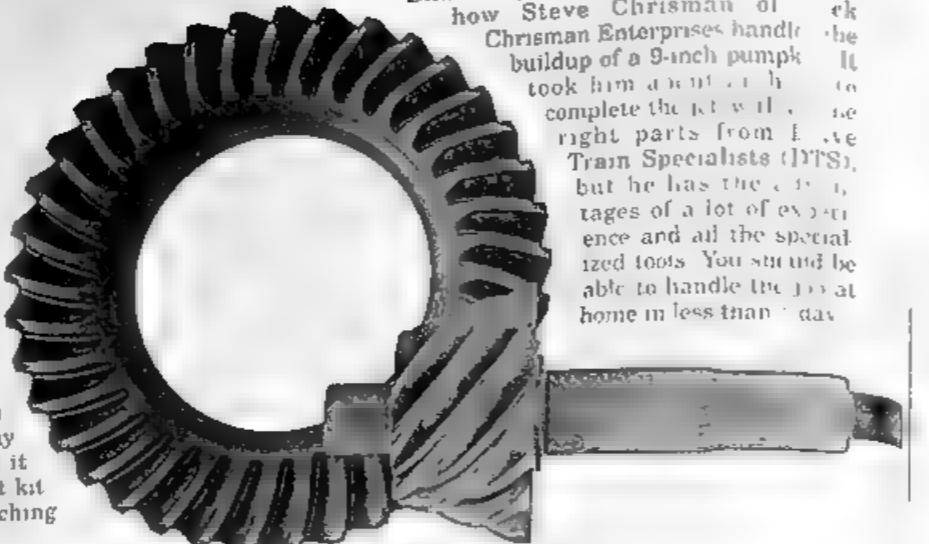
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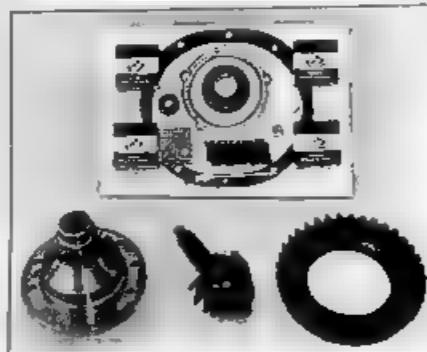
By David Freiburger

From Cobras to classics, the Ford 9-inch rear end is probably one of the most common suspension components found on kit car frames. This standard of the industry shows you mean business. The Ford 9-inch is strong, it looks good, and an endless number of new and used parts are available for it. Many kit manufacturers include a Ford 9-inch with the kit, but you may want to scrounge one and rebuild it yourself. Or the one on your current kit project may be due for some wrenching.

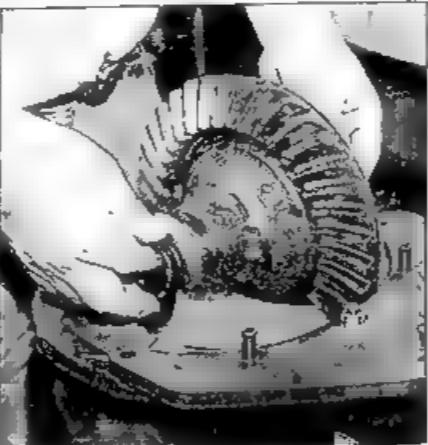


HOW TO ASSEMBLE A FORD 9-INCH

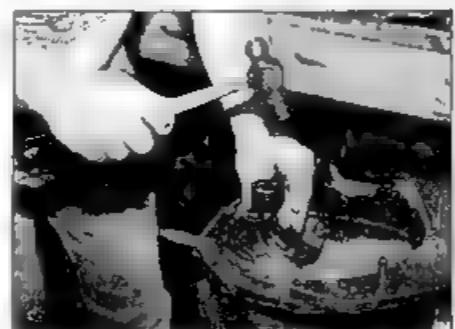
1 DTS assembly kits give you all the right parts before you begin. To order, you'll need to know the diameter of the carrier bearings (2.891 inches, 3.062 inches or 3.250 inches) as well as the pinion-support type (stock or large Daytona style). Large-pinion Richmond Pro Gears also require special parts. We ordered an assembly kit, Richmond 4.11 gears and a 31-spline Detroit Locker.



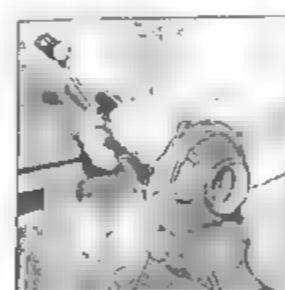
2 Once the "pumpkin" is pulled from the housing, remove the side-adjuster locks and bearing caps. Mark the caps with a punch so that you can put them back the same way they came off (and never mismatch caps from a different case). Once the caps are off, lift the carrier out of the case.



3 Next, remove the five bolts that hold the pinion support. The support will come out with the yoke and pinion gear attached, and there should be a thin metal gasketlike shim between the pinion support and the case. Save it for later use.

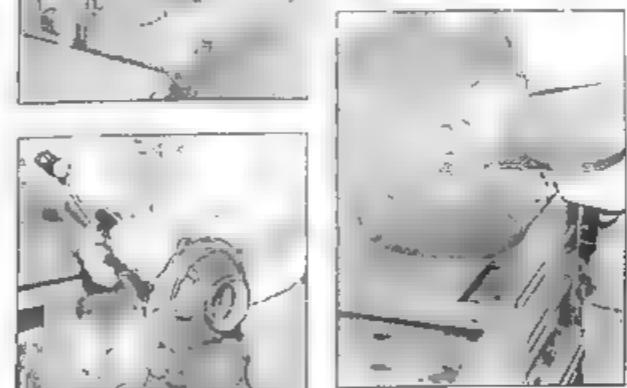


4 The last component in the case is the rear pinion-support bearing. Use a screwdriver to fold back the retaining tangs, then tap the bearing and the race out of the case using a 1 1/16-inch socket.



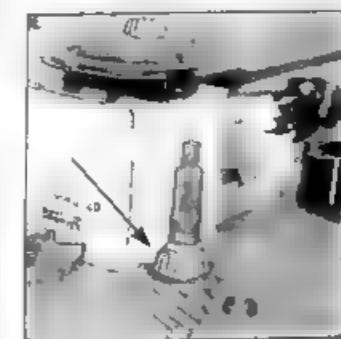
5 Now the pinion and yoke can be taken apart by removing the yoke nut. You probably won't have luck getting them apart without a press, but you can try using a puller on the yoke. Leave the bearing on the pinion if you're using a new bearing and a new gears. You'll also find a crush sleeve slid over the pinion.

6 Next, hammer the seal and the race out of the pinion-support housing.



7 Before assembly, Chrisman burnishes the ring and the pinion with sandpaper so they rotate without any tight spots. Verify that the gears are the ratio you want before doing this (the number of teeth on the ring divided by the number of teeth on the pinion gives you the ratio).

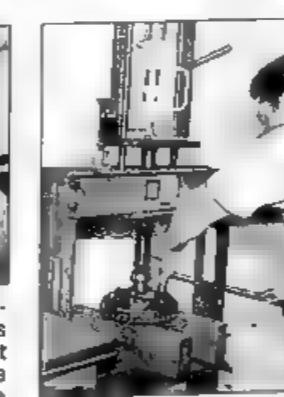
8 After polishing the gears, use solvent to wash every part that will be reassembled into the pumpkin, including the new bearings, the gears and the carrier. Also check that your axles fit the carrier before washing it. Now is also the best time to paint the housing.



9 Chrisman uses a hot plate to heat the carrier and pinion bearings so they expand a little to slide on without galling. You still may need a little tapping to get them on squarely. Make sure to also slip the new crush sleeve (arrow) onto the pinion gear.



10 The ring gear also gets the hot plate treatment so that it slides easily onto the carrier. If you don't have a hot plate, put the carrier in the freezer and the gear in the sun for a while. Don't press the gear on or pull it on with the bolts because that can cock the gear slightly or put a sliver of metal between the gear and the carrier.



11 DTS supplies new ring-gear bolts in its assembly kit, and Chrisman torques them to 75 ft-lbs.

TOOTH-CONTACT CHART	Condition	Remedy
HEEL (OUTER END) TOE (INNER END)	IDEAL	ideal tooth contact for Richmond 49 series gears or for street use
HEEL (OUTER END) TOE (INNER END)	COAST	Ideal contact for Richmond 69 or 79 series gears, or for drag-only use
HEEL (OUTER END) TOE (INNER END)	COAST	High tooth contact—heavy on the top of the drive-gear-tooth profile Move the drive pinion deeper into mesh (use a thinner shim)
HEEL (OUTER END) TOE (INNER END)	COAST	Low tooth contact—heavy in the root of the drive-gear-tooth profile Move the drive pinion out of mesh (use a thicker shim)

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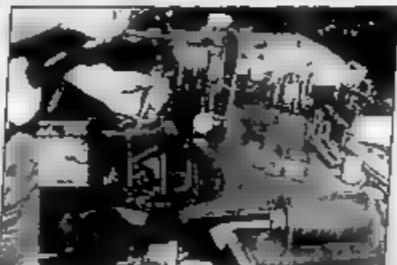
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132/125 F.E.
Front 9" Sump

PTS-830
289/302
Front 9" Sump
Road Race

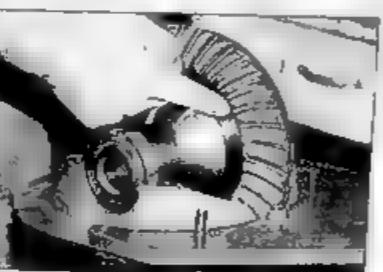
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Road Race

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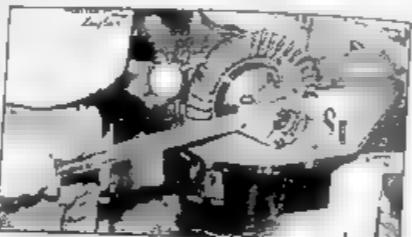
HOW TO ASSEMBLE A FORD 9-INCH



13 The last item to prep is the case, which should have the front pinion-support bearing and race installed with the lock washer. Now you can lubricate the bearings and reinstall the yoke-and-pinion assembly using the same shum that you took out during disassembly.



14 Drop the carrier assembly into the case to check for clearance. Low gears often require clearing the case near the pinion bearing, but the new Richmond gears came beveled so that wasn't necessary. Lube and reinstall the carrier-bearing caps and side-adjustment rings, tightening them just enough to take the play out of the bearings.



15 Once you've preset the backlash (see next caption), you're ready to set the contact pattern for the gears, which is very important for strength and to prevent gear noise. The pattern is determined by the engagement depth of the pinion into the ring gear, which is set by the thickness of the shum between the pinion-support housing and the case. Use the marking compound supplied in the DTS kit to coat a section of five or six teeth, then spin the gears through the normal direction of rotation and compare the pattern to those in the "Tooth-Contact Chart."

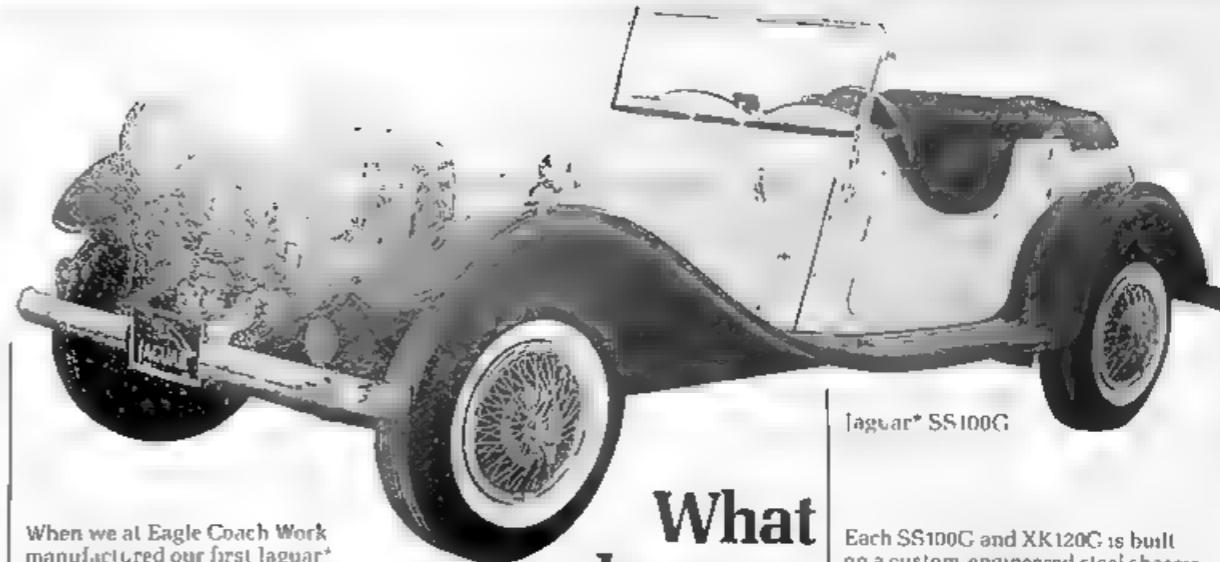
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Richmond Gear
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Old Norris Rd
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The informative instructions that come with the Richmond gearset recommend the following procedure to break in the ring and the pinion for long life. After filling the differential with EP-90/140 gear oil, put the car on jackstands and run the engine at idle in high gear for 15 minutes, then stop and let it cool. Drag cars are finished there, but street cars should be driven normally for 5 to 10 miles and then stopped to allow the gears to cool for half an hour. Do that two or three times. If the vehicle is used for towing, drive it 200 or 300 miles before hooking up the trailer.



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SMC's New Chassis Design Cracks the Technology Barrier

PHOTOGRAPHY STEVE TEMPLE

Pity the Cobra replica buyer. There are so many Cobra kits out there—close to 40 at last count—that they all start to look alike. In fact, they all do look alike, at least at first glance. So how do you tell them apart? You have to peel away the fiberglass skin and check out what's underneath.

In the case of Specialty Motor Cars (SMC) new IRS

replica, the difference is in the chassis. SMC's IRS is built on a monocoque frame and Ford IRS front suspension pieces. There's only one thing wrong with this sort of product. It's virtually the industry standard for SMC replicas, and SMC's IRS costs just one \$14,000 package off-the-shelf. But SMC wants to go one better. It's wanted to go one better than the rest of the IRS crowd by creating a chassis that's not only stiffer, but lighter.

Testing of the IRS chassis showed that it's

as difficult as ever to get it to move because, by the time it's bolted down as a rigid chassis, using modifications to chassis, and get this right, ball joints, and ever known for stiff handling.

Now, fast-forward to the '90s, the age of spaceframes and monocoque construction. Both chassis types offer far more torsional rigidity but a spaceframe is difficult to fit underneath a Cobra body.

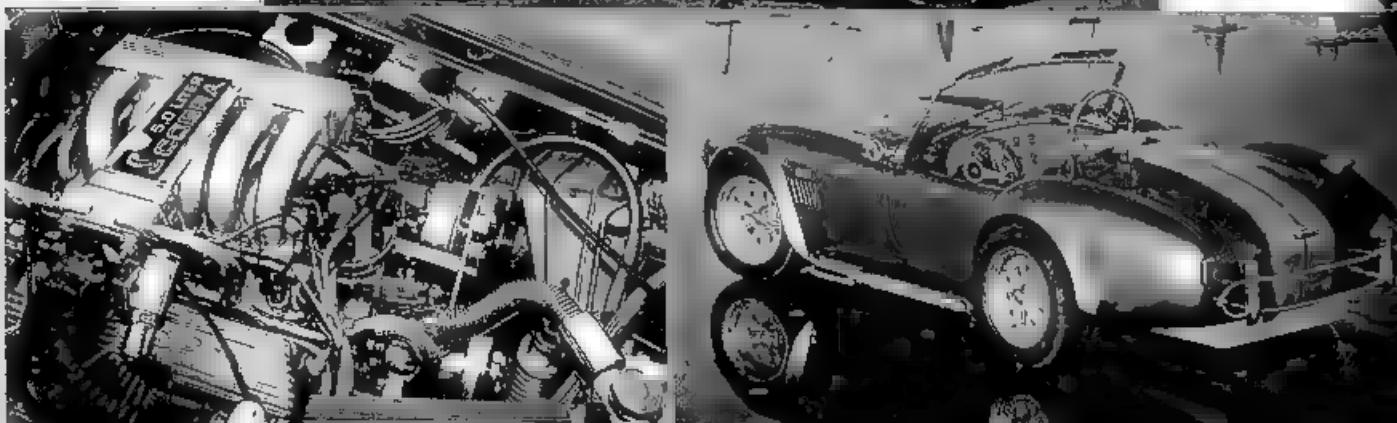
That leaves a monocoque (French for "one shell"), the type SMC chose.

To develop this frame, Kelly enlisted the aid of Richard Hudgins, an engineer with a passion for vintage race cars and expertise in Computer-Aided Design (CAD). Using

a CAD system and MIT-developed vehicle-dynamics software in conjunction with Aegis finite-element analysis and modeling programs, he created a semimonocoque frame that stays within the packaging requirements of the Cobra body shape yet offers unprecedented levels of stiffness. Hudgins claims a minimum 3300 pounds per degree of torsional resistance which can be increased to 5500 pounds by hard-mounting the

engine and the gearbox, or even as much as 7500 pounds by adding a rollcage (these figures have been verified by Spectrum Technologies, an independent engineering firm). The car's foundation consists of an intricate set of interlocking steel panels welded to a central box tube surrounding the driveline and reportedly weighs a total of less than 271 pounds.

The key to this design's uniqueness is a structural panel bolted underneath the length of the transmission tunnel. This is not just a cover plate to keep out dirt and debris. The shear loads and spacing on the GM self-locking shouldered bolts are precisely calculated so that



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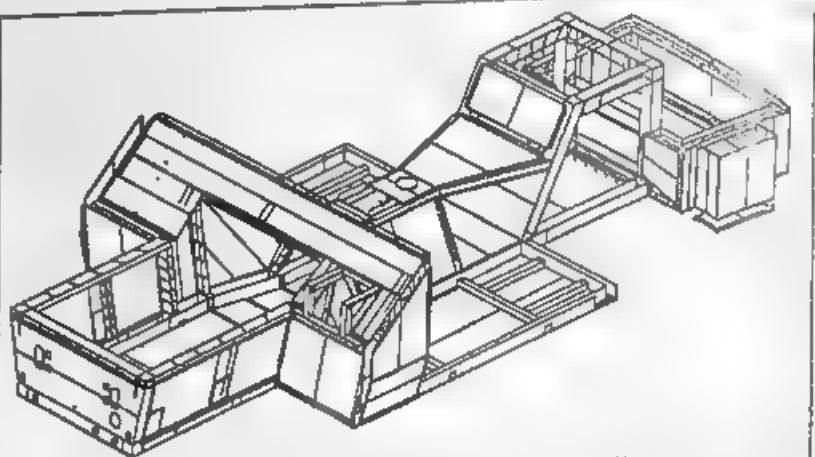
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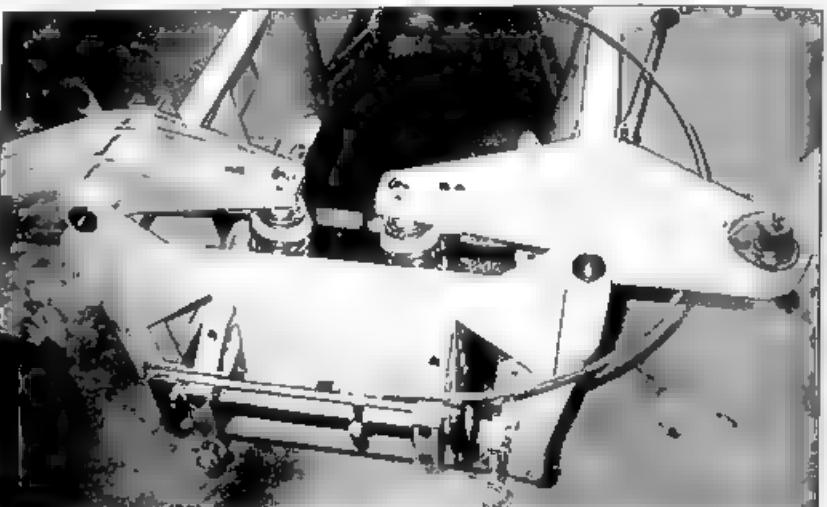
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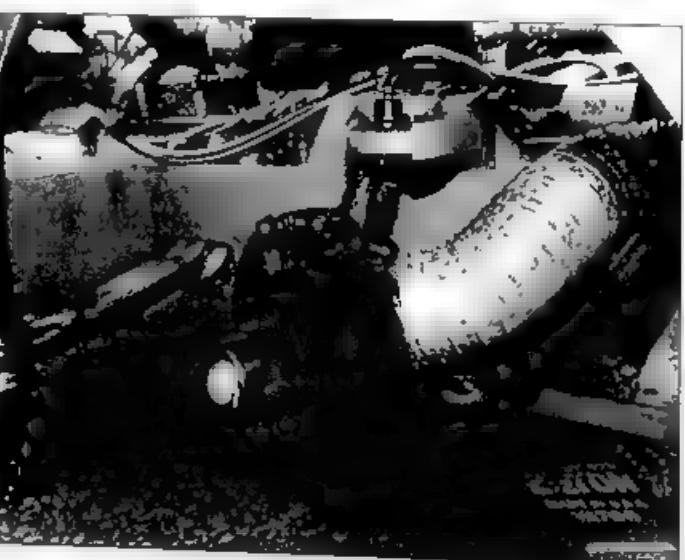
HARD SCA



This computer-generated drawing of the frame shows how the stressed panels fit on the tubular frame to form a semimonocoque chassis. A structural panel bolts to the underside of the transmission tunnel to form the monocoque section.



Custom-fabricated 356-T6 aluminum rocker arms and inboard-mounted coil-over shocks reduce the unsprung weight of the front suspension.



Flex hoses vent cooling air to the front brake rotors. Note how the wheel upright attaches to the outboard end of the rocker arm.



The structural panel bolted to the underside of the transmission tunnel runs the full length of the frame.

the panel serves as a structural member, encapsulating the backbone to form the semimonocoque frame. (To qualify as a full monocoque, the chassis would require the perimeter frame seen in Indy cars, but that type won't fit underneath a Cobra body.)

One minor drawback of this new frame design is the limitation to a small-block engine (a 289 or 351ci Ford is recommended), and even that is a tight fit, especially around the exhaust manifolds. Kelly says the first one was a bear to install, but he now has a jig set up to fabricate headers that will fit easily. Of course, engine technology has come a long way since the days of the 289 Cobra, so it's not terribly difficult nowadays to pull big-cube power out of a small-block package.

With a highly rigid chassis, Hudgins could then incorporate high-performance suspension components that perform their functions to the full with no interference from frame flexing. In the front, he drew on his Indy-car design experience to create a rocker-arm setup with inboard coil-over shocks to reduce unsprung weight. He also added cooling ducts that feed air directly to the 11-inch vented front brake rotors. (The 10-inch rotors in the rear are vented only for racing applications.) The rear end employs a late-model Ford Thunderbird Supercoupe's 8.8-inch differential, CV joints, halfshafts and uprights. Custom-fabricated control arms lower the roll center from the stock T-bird setting. Carrera coil-overs offer more performance-oriented damping, and a blade-type adjust-

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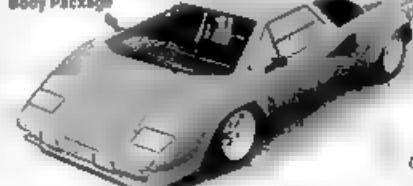
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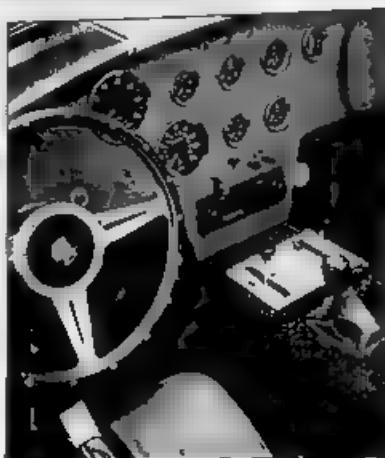
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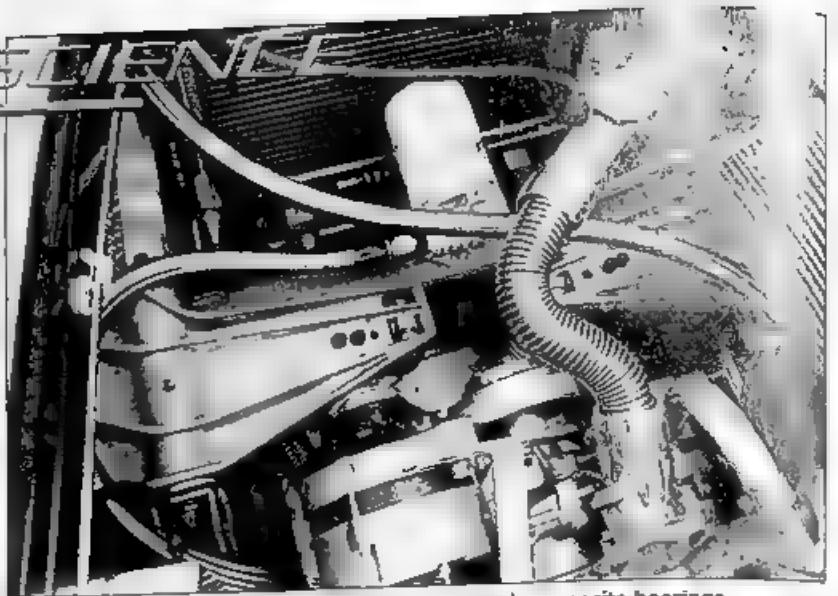


Twin levers for adjusting the sway bar settings from soft to hard are located forward of the gearshift.

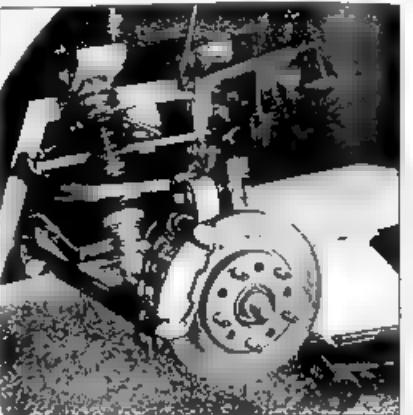
ment for the front and rear sway bars allows the driver to control the ride settings from soft to hard right from the cockpit.

It all sounds like a super setup, but what do the numbers show? Although the brand-new chassis was not fully tuned, in the slalom the car sprinted around the cones at 69 mph and exhibited little if any body roll. It simply planted its feet at each gate and stepped through as easy as you please. This SMC is one of the smoothest-handling Cobras we've ever tested. On the skidpad, the 9g figure is respectable but could be improved with stickier rubber, ditto for the already crisp stopping distance from 60 mph of 149 feet.

The fuel-injected 5.0-liter was bogging down in the midrange on the dragstrip, but we nailed at least one clean shot: 13.9 seconds at 105 mph and 0-60 mph in 5.4 seconds. The big-block boys may scoff at these times, but they should keep an eye in the rearview mirror because this prototype was outfitted with a relatively tame 285hp 5.0-liter with Ford SVO's GT-40 heads. A 351 Windsor with some massaging could offer a prodigious increase in output and without the weight penalty of a 427. (We hear that SMC's next IRS Cobra will come so equipped, and we can already feel the itch on our right foot.) Even so, the 5.0-liter delivers appropriate doses of power. At full-throttle on the dragstrip, the car feels totally controllable, a handling trait we've learned not to expect from all the Cobra replicas we test. Through the slalom, the feel is sure-footed, not



The aluminum rocker arms pivot on filament-wound composite bearings



The rotary blade adjustment for the sway bar is visible in the upper-right area of the rear wheelwell.

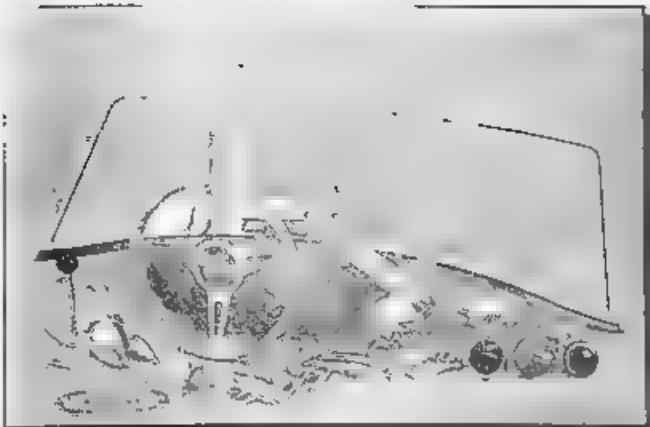
sloppy; balanced, not overblown. It's utterly predictable on the street but has tremendous capabilities on the track, a rare combination of attributes. We've tested many other Cobra redesigns that attempt to improve on the original, and SMC's IRS version displays the most finesse and refinement we've ever experienced. Hudgins admits he's pretty picky about his engineering, and we're glad for that fact. This is the sort of car that will take you to the limits of adhesion with complete poise and confidence.

Considering the technical excellence of the chassis design, we feel that the car warrants even better tires than the Michelin XGT Zs (P245/50ZR16 in the front and P315/40ZR16 in the rear). These are good tires, but a great chassis merits really great tires. With 17-inch wheels (not available in time for our track test), a wider selection of performance rubber can be fitted. Some other things we'd probably tinker with would be the height of the seat (a thinner pad is available) and the overly small steering wheel (we like the vintage look and feel of those large-diameter ones used on the original). Our only other criticisms were the sharp edge on the dash that rubs against the driver's right knee and the fuel cell that protrudes beneath the rear bodywork a bit too far. It's well-protected by the frame but disrupts the flow of the body lines.

By now, you're probably calculating what this level of performance is going to cost. Well, the answer is not as much as you might expect. For about \$29,000, the IRS model comes as a rolling chassis with the

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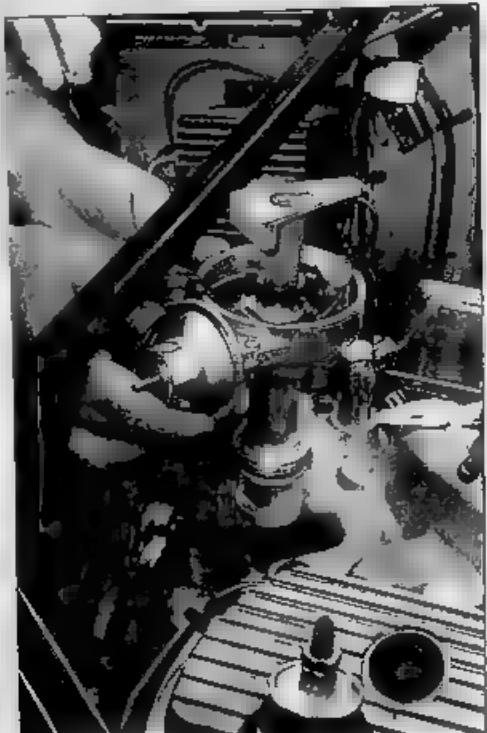
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Firing Squad



How to Execute an Electronic Ignition

By Marlan Davis

No one really worries much about the ignition system—until it craps out. A distributor and a module just aren't glamour items. They don't sound mellow like a bitchin' exhaust. They don't lope like a big cam. They don't stick through the hood like a hulking Jimmy blower. And of course, an ignition system doesn't "make" horsepower as the supercharger, cam or headers do. No, the ignition is one of those unsung heroes that's never noticed until it's too late. For while you won't see any more power from a properly functioning ignition, an unreliable sparksorter prevents all those other power makers from realizing their full potential.

Reliability begins with a modern electronic trigger. Anyone who still relies on points is out to lunch (unless

they just have to have the original-style pieces on their replica). Points start going away the moment they're installed, but today's factory-type distributors with electronic triggers often outlast the engine, and they keep spark plugs alive for 50,000 miles.

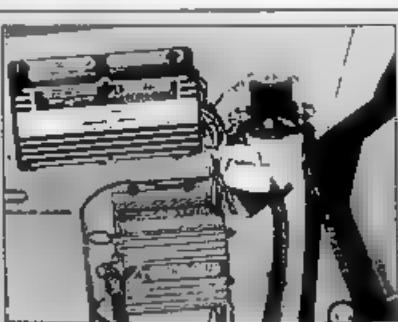
For most performance engines an electronically-triggered distributor alone isn't enough. Because these engines operate at higher rpm, they need more juice—a hotter coil, a higher-output module and better spark plug wires. That's where the aftermarket comes in, with an integrated team concept that produces an efficient ignition system tailored for specific vehicle usage. An example of this approach is Jacobs Electronics' Energy Team ignition system, seen here being installed on a custom-wired '65 Ford 289 previously equipped with the factory points ignition distributor. While the photos apply to this installation specifically, the general concepts and procedures enumerated herein apply to most modern electronic ignition systems.

Mounting the Module & Coil

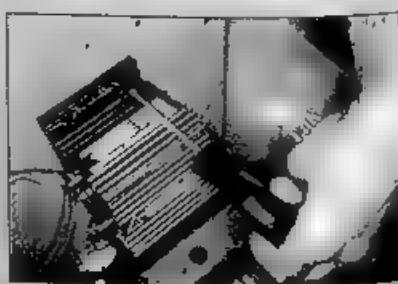
This installation uses a Jacobs Energy Pak Pro-Street 8000rpm computer ignition module backed by a Jacobs Ultra Coil. The Energy Pak is an electronic ignition designed to custom-tailor spark energy and profile based on engine need. After spark initiation, this module actually reads resistance across the spark plug gap, adjusting spark intensity and duration.



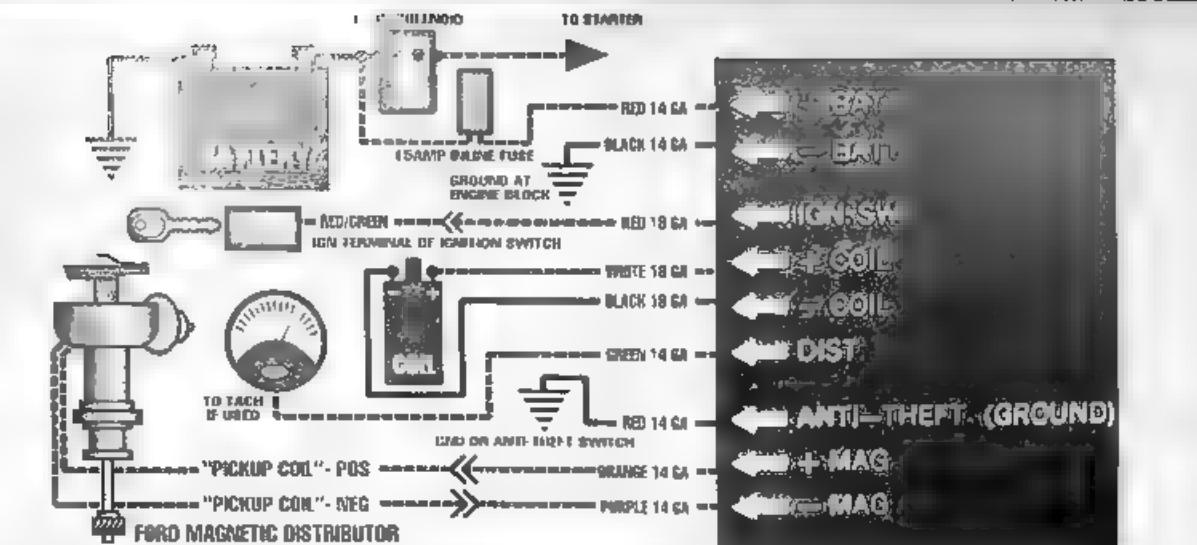
Using the ignition units as a template, center-punch the mounting hole locations, then drill pilot holes using a 1/8-inch drill bit.



Space permitting, mounting the module and oversize coil together makes for a neater and more sanitary installation.



Install the ignition units using the supplied self-tapping screws.



This is how to wire the Energy Pak on a Ford application. The bottom plate of the Energy Pak box has a wiring legend showing correct hookup for all wires. When using the Jacobs unit's built in magnetic pickup instead of the O.E.M. internal pickup, the "+ Mag" orange and "- Mag" purple wires go to the distributor's "pickup coil POS" orange and "pickup coil NEG" purple wires; the "Dist" terminal is used to run the tach.

The Wiring Scheme

Jacobs tailors its specific Energy Pak units for compatibility with specific O.E.M. distributors, coils and wiring harnesses. In the computer world, this is known as "plug and play." In other words, when replacing previously installed stock ignitions with Jacobs components, all you usually need to do is unplug the old parts and plug in the new parts. However, this installation also involves upgrading from a points to an electronic distributor, and the ground-up custom car no longer uses a stock-based wiring harness. For these reasons, Jacobs supplied a universal-style kit. Although specific wiring details vary on different makes, models and vehicles, the general scheme shown here applies in most instances. Exceptions include early points and late factory computer-controlled systems. Jacobs covers most variations in its comprehensive instructions.

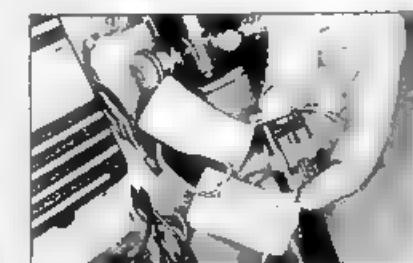
If you need to shorten or lengthen the supplied pickup coil harness to the distributor or if you are custom-wiring a magnetic-impulse electronic distributor from scratch, be aware that such distributors function like small A.C. generators, producing a tiny amount of electrical current that is used to turn the control box's transistors on and off. Because this current also produces a pulsing magnetic field in the

wires, running the wires in parallel could cause the current to jump from one wire to the other, resulting in false triggering. Eliminate this problem by wrapping the two coil pickup wires around each other. And as the alternator and other rotating

motors—including the windshield wiper and heater-blower motors—also produce a magnetic field, be sure to route the pickup coil wires as far away as possible from these devices. Keep the wires away from the exhaust and moisture sources too.



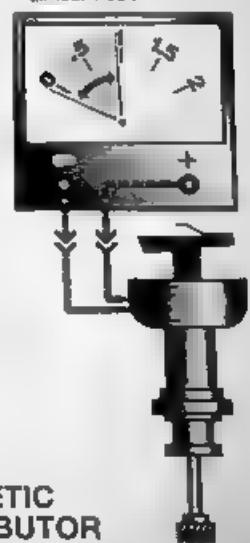
Notice how the pickup coil wires are wrapped around each other. Called a "twisted pair" by engineers, this prevents false triggering by canceling out the magnetic field generated by an electronic distributor.



Hook the large (14-gauge) red "+ BAT" wire to the input side of the Ford starter solenoid. On non-Ford applications without a remote solenoid, hook the heavy red "+ BAT" wire to the starter "B+" terminal, suitable main junction block or directly to the battery's positive stud. Like the tag says, install the inline 15amp fuse last, "when ready to start engine."

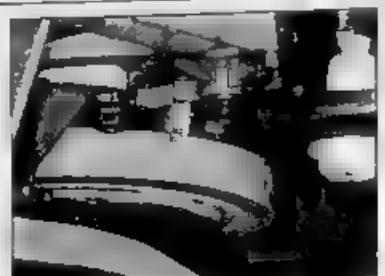
Module Check

If upgrading distributors using salvage yard components, you can use a voltmeter to check whether the O.E.M. electronic trigger still works. An old analog voltmeter works best. Connect the voltmeter's leads to the distributor's trigger wires (orange and purple on a Ford; polarity isn't important). Set the voltmeter to its lowest D.C. scale. Rotate the distributor shaft by hand in its normal direction of rotation (counter-clockwise for a Ford, clockwise for a Chevy). Any needle movement means the trigger is still good.



MAGNETIC DISTRIBUTOR

Firing Squad



Bring the engine to TDC, No. 1 firing position, with the engine on the compression (not exhaust) stroke. Determine this point by removing the No. 1 spark plug (passenger side, front on a Ford), placing your finger in the hole and feeling for the presence of compression pressure as the balancer approaches TDC.

How to Find the Ballast Resistor

Traditional points ignition systems use an inline voltage-dropping ballast resistor between the ignition switch and coil positive terminal to avoid burning out. On the other hand, factory electronic ignition systems (such as GM's HEI and Ford's Duraspark) require a full 12 volts at all times to develop max voltage potential. In lieu of an easily recognizable separate ballast resistor, most stock wiring harnesses use a calibrated resistance wire hidden somewhere within the stock wiring loom. Many old harnesses have been severely butchered, so how do you know for sure if a resistance wire is present? Easy: Connect an ohmmeter between the battery positive (+) and coil positive (+) terminals after first disconnecting the negative battery cable. A reading between 1.30 and 1.45 ohms means a resistance wire or inline ballast resistor



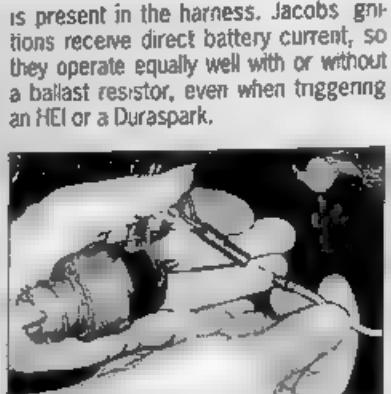
Mark the installed position of the old distributor's rotor (A). It should correspond with the cap's No. 1 terminal. Also note the orientation of the vacuum advance can (C). Pull out the distributor. As it disengages from the cam gear, the rotor on a Ford will rotate 30 to 45 degrees counterclockwise (B).

Installing the Distributor

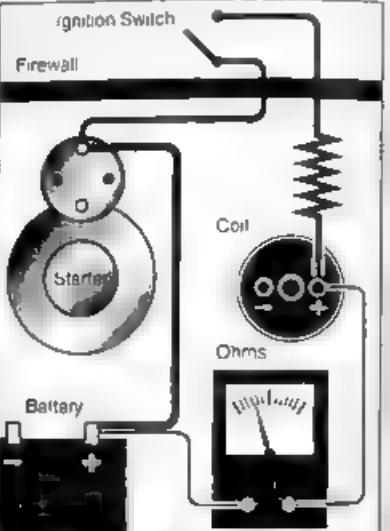
Distributor "R&R" doesn't have to give you a headache. A little attention to detail beforehand makes for a foolproof installation.



Install the new distributor with the rotor at position B. After engaging the cam gear, apply steady downward pressure on the distributor body until the distributor engages the oil pump driveshaft. At this point, the rotor should be pointing toward A. Rotate the housing as required for proper vacuum can orientation (C). It may be necessary to turn the oil pump driveshaft with a hex driver or to rock the engine back and forth slightly with a breaker bar on the balancer to achieve proper distributor engagement and correct rotor alignment.



is present in the harness. Jacobs ignitions receive direct battery current, so they operate equally well with or without a ballast resistor, even when triggering an HEI or a Duraspark.



Use an ohm meter to check for the presence of a ballast resistor or resistance wire.

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Spark Plug Wires

High-output ignition systems should be teamed with high-current spark plug wires to avoid crossfire and deliver full voltage to the plugs. Because Ford Duraspark and GM HEI distributors have spark plug-style cap terminals in lieu of the older design socket terminals, installing a new plug wire set when upgrading to the later distributor is mandatory. This installation uses Jacobs Energy Core spark plug wires, which feature a spiral-wound core that provides required radio-friendly resistance characteristics with better conductivity than old fashioned fiber-core wire (200 W/ft or less versus 6000 to 20,000 W/ft for O.E.M. wires).

Route spark plug wires away from moving engine parts. Do not let the wires touch the exhaust manifold. Remember that the engine rocks, be sure the wires won't rub against or be pinched by stationary body parts. Use separators to keep wires from contacting each other. If one consecutively firing wire must cross over another, minimize crossfire potential by making the cross using a 45-90-degree angle.



Use nonmetallic separators such as these made by Jacobs. The two halves are held together by a push-in "rosebud" pin.



Jacobs Pro Fit wire lengths can be set to an exact fit within $\frac{1}{4}$ inch without special crimping tools, thanks to its unique press-in terminal clip. **KC**

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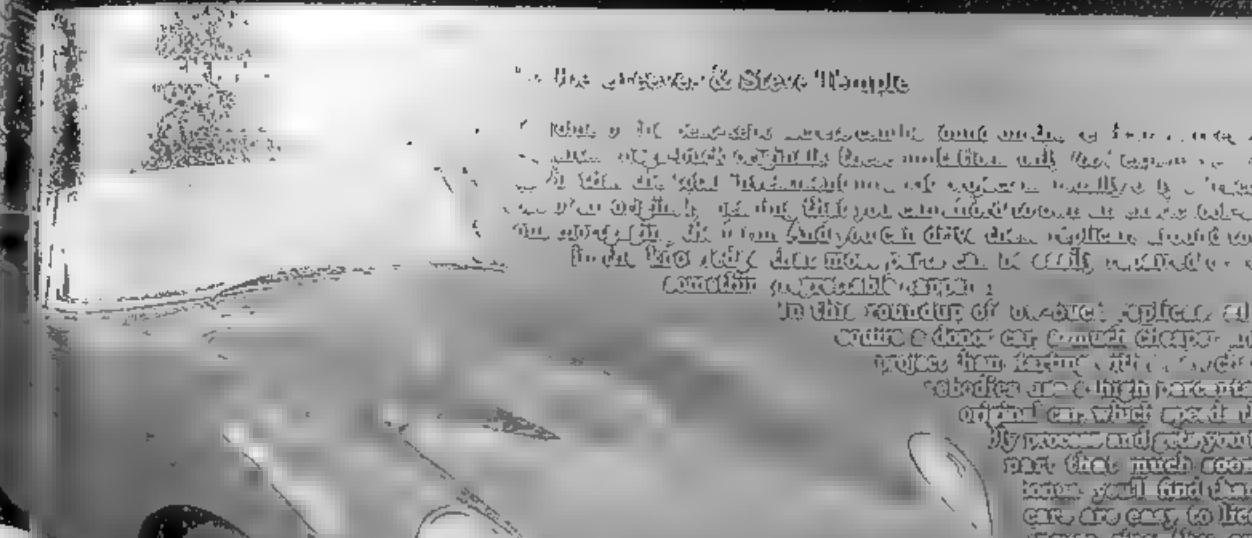
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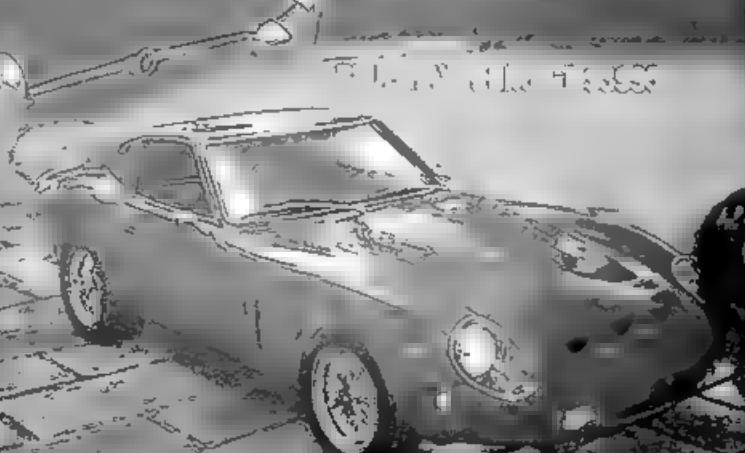
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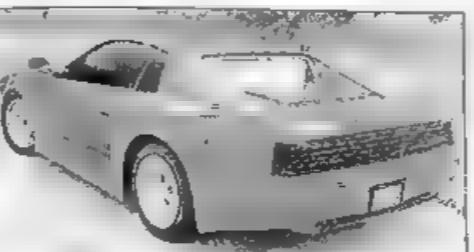
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GREAT PRETENDERS

HANDCRAFT G.T. 2+2

Breathing New Life Into GM's F Bodies

Orville Feikema of Handcraft Motorcars in Bradenton, Florida, has been in business since 1982, manufacturing a neoclassic kit and fiberglass radar arches for boat companies. His GT 2+2 is designed to fit '82-'92 Firebirds and Camaros. With the exception of a lowering job, he uses Bell Tech spindles in the front and shorter springs in the rear; there are no chassis modifications.



A new fiberglass hood, front fenders and bumper pieces bolt to existing chassis holes, but the door skins and rear fender pieces are attached (epoxied and screwed) right over the stock doors and rear quarter-panels. The vertical sail panels must be feathered into the roof with body filler when prepping for paint. The stock tailights are retained but have a new custom aluminum grille. New rocker panels attach to the body with full-length aluminum brackets.



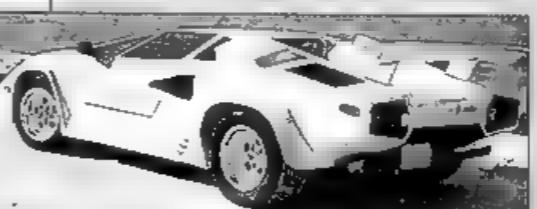
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MAC'S AUTO BODY COUNTACH REPLICA

A Different Way to Drive a Wedge

The Mac's Auto Body kit is reasonably priced at \$4999, but be prepared to spend a good bit of time putting it together. The company averaged 400 hours on each of the last six turn-keys it produced, so a novice builder should probably figure a bit more time.



The kit is installed on a stock-length Fiero that has been stripped of its outer skin. You'll



also need to cut the roof, enlarge the wheelwells, reposition the angle of the radiator and reinforce the chassis with angle iron, all tasks covered in the company's

instructional video. Some of the preliminary work is done for you, since the inner and outer door shells are bonded together, the upper and lower wing halves are assembled, and the wing-mounting struts come with rods already installed. Suspension changes are

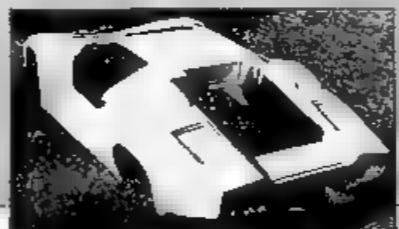


minimal, but the front end does need to be lowered. The assembly begins by loosely fitting the one-piece steel-reinforced body shell onto the prepared chassis, where it will be secured later. Bill McDonald, owner of Mac's Auto Body, takes a different approach from most builders, since he fine-tunes adjustments on the swing-up doors before the body is rigidly mounted to the chassis. When the doors are in place, he gently pushes the body left or right until he gets a perfect match with the chassis. Then they are bolted together.

Mac's admits that installing pop-up headlights can be challenging but gives the builder a simpler alternative: narrow fixed headlights from a late-model Pontiac. Mac's \$750 Stage II kit simplifies the assembly process even more, since it provides hard-to-find items such as the windshield, grilles, wheel adapters, Lexan side windows, window frames, Countach-style taillights, hinges, rubber weather stripping and an installation manual. Also priced at \$750, the interior kit includes the dash, door panels and center console, all done in natural leather. Finally, Mac's offers 10-inch Dunlop tires for the rear

and 8-inch tires for the front mounted on four 15-inch Progressive rims for \$836. This brings the total cost of the kit, with the accessory packages, to just under \$7500. Not bad for a really sharp wedge.

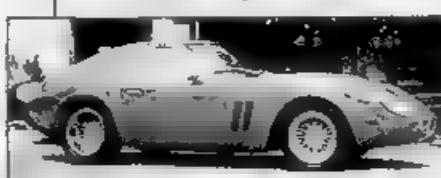
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GREAT PRETENDERS

BLUE RAY RHINO GT One Really Cool Coupe Kit for Z-Cars

Because of their ease of assembly and their wide appeal, open-top roadsters are the most popular kit projects. Sure, having the wind in your hair and the sun in your face is a great feeling, but what do you do when the rain and snow seasons hit? A hardtop is a much more practical choice. The trick is finding a coupe kit that's not only alluring but relatively easy to build. Blue Ray's Rhino GT nails it on both counts. Its lines are easily mistaken for a timelessly stylish Euro-exotic, and here's the simple part: This rebody fits on a Datsun Z-car with no major chassis modifications required.



280 Z-cars. Slightly damaged 260Zs are recommended as donors because they are relatively common and

affordable and also faster and better made than the 240Z (which is usually best kept original as a collector's car). For installation, the Rhino's front is essentially a one-piece nose section that replaces the stock fenders and bumpers. To fit on the rear clip, some minor sheetmetal work is required on the wheelwells and the rain gutters, and you have to remove the tailpipe, the shock absorbers and the gas tank. Also, the vertical panels must be bonded and faired into the roof. (Blue Ray recommends a special epoxy adhesive that goes for \$200 per gallon.) Once the main body panels are on, the only remaining pieces are the door skins and the rocker panels. Various trim and accessory options are also available from Blue Ray to finish off your project.

As coupe kits go, this is a fairly simple project compared to, say, a Fiero-based Countach replica, which usually requires extensive frame modifications. And if the Datsun inline-six doesn't offer enough performance for you, a Chevy V8 will fit nicely between the fenders.

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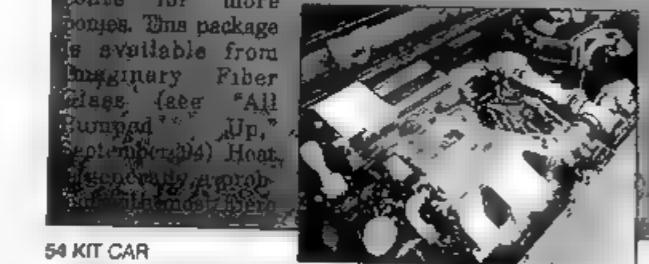
CORSON SPYDER

Red-Hot Looks Plus a Twin Turbo

We've seen many Fiero rebodies come and go over the last few years, but one of the most enduring designs is the Corson Spyder, inspired by the 512 Boxer. That's because Randy Corson really took his time to develop a clean high-quality kit with fiberglass panels finished on both sides. The \$10,500 kit includes everything: a subframe, lights, grilles, mounting hardware and a separate inner liner with fixed attachment points to ensure an even

fit of the double-sided body panels. Corson also offers a really slick Chevy V8 conversion package (\$1950) that fits right in with a minimum of fuss and hassle.

On the car shown here, however, owner Jim Drye decided to keep the V6 stock and go the twin-turbo route for more ponies. This package is available from Imaginary Fiber Glass (see "All Pumped Up," September '94). Hooray for Corson's V8 swap.



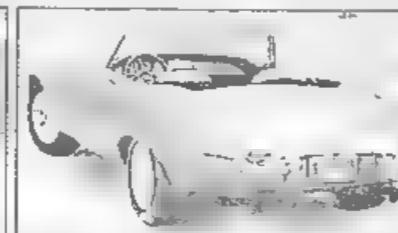
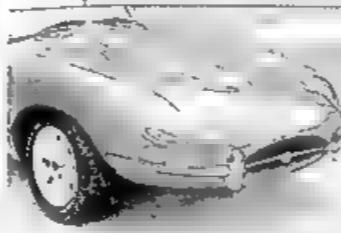
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BRADEN RIVER ENGINEERING RX-KE

Classic Brits Body With a Japanese Soul Roger Feikema of Bradenton, Florida, and his brother Orville, who offers the G T 2+2 kit also covered in this feature, began their lifelong involvement with cars as kids by winning top honors in a statewide competition of the famous Fisher Body Design contest. Feikema's love for vintage Jags and his natural talent as a designer prompted him to create a replica of his favorite, the E-type.



part of the basic kit and employ the roll-up windows from the donor car. Original Mazda hardware, hinges, struts, latches and so on can also be used.

The estimated 25 hours to mount the

body can vary substantially depending on the skill level of the builder, but no fiberglassing or welding is required. The frame-stiffening package is attached with bolts or sheetmetal screws, although it can be welded for increased rigidity. Fiberglass edges around mating surfaces such as the doors, the cowl and the trunk lid are left intentionally long to allow the join lines to be ground to a precise match.

Prices for the basic kit begin at \$4995, which includes a six-piece fiberglass body (including a rear clip, a front clip, two doors, a trunk and a gas-door lid), hinges, a chassis-stiffening kit, a pattern for a Lexan windshield, a gas-filler extension and a steering-column extender. At \$8995, the deluxe kit contains all the above plus a framed DOT-approved glass windshield, formed-plastic headlight covers, lights, bumpers and a set of genuine knock-off wire wheels.

The completed car has instantly recognizable lines and the spirited performance and handling of the sporty Mazda. Feikema says his new kit easily out-performs his other car, a meticulously restored original '70 Jag E-type. And, he notes, it also doesn't drip oil on the garage floor.

SOURCE

Braden River Engineering
Dept. KC07
1620 Palma Sola Blvd.
Bradenton, FL 34209
813/747-6146

CREATIVE COACH DEROSA

No Stretch of the Imagination

Some Fiero rebodies are simply that—a new body on a stock chassis. Others require fairly substantial frame mods to create those exotic lines. For instance, if you want the right stance for an Italian Redhead replica, you must lengthen the frame 7 1/4 inches. It's not as difficult as it might sound, especially for Mike Bova of Creative Coach, who is currently finishing up a Corvette limo that's a full 10 feet longer than the standard wheelbase. If he can stretch that, he can stretch anything.

The \$7900 DeRossa kit includes steel pieces for the frame extension, or Bova will perform chassis surgery on a customer-supplied car for an extra \$1000. To get the right rake to the windshield, Bova notch-



es and angles back the windshield posts and cuts down the rear window instead of raising the rear frame extension. The kit also consists of 14 major body panels plus assorted accessories such as taillights, grilles and side mirrors. This \$7900 price does not cover the \$3100 glass package which includes a windshield, curved rear glass, quarter-windows and door glass. The company also offers an interior package for \$3800 that not only recovers the dash, the console and the door panels but also creates a new look for the door handles, the windshield posts, the shifter and the gauges.

Yes, all these options do drive up the cost, but you don't have to do them all at the same time. And it's the details that make the difference. **KC**

SOURCE

Creative Coach
Dept. KC07
2115 S. Hellman, Unit J
Ontario, CA 91761
909/923-1863

Engine Tips & Tricks

Building a kit car is tough enough without getting bogged down by the engine instal. To save money, many kit builders prefer to drop in used or rebuilt blocks, and these may need some attention. To simplify this aspect of your project, we thought you'd like to see a few of our favorite slick tricks. These tips can make your life a whole lot easier and help you avoid making some serious—and expensive—mistakes.

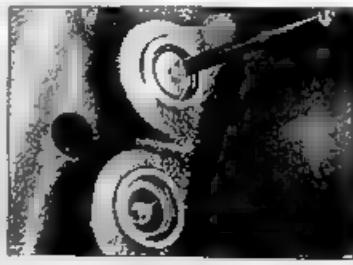
TURN OVER

There are a number of tools that make it easier to turn the engine over during assembly. The simplest we've seen is this socket (A) that slips over the crankshaft snout and keyway and allows you to turn the engine over with a 1/2-inch-drive ratchet or breaker bar. This crank nut (B) also slips over the crankshaft snout and keyway, but it fits behind a degree wheel.



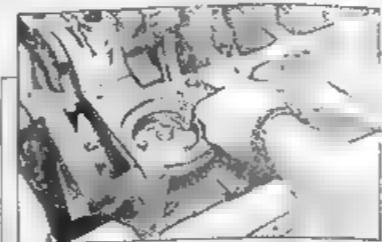
LIFTER TIP

When degreasing your camshaft, you need to position the dial indicator plunger so it will read accurately and repeatedly. While aftermarket small-block Chevy cam followers are available, a dirt-cheap alternative is to acquire a used-but-still-good hydraulic lifter and remove the snap ring and the pushrod cup. Then invert the cup and glue it into the lifter body. The bottom of the inverted cup has an oil hole that makes a great locating device for the dial indicator, making your dial-in procedure a snap.



Some Super Shortcuts and Helpful Hints

By Jeff Smith



GET 'EM NOW

There are a few things that sooner or later you'll need but won't have, and you won't discover that you need them until five minutes after the parts store has closed. Lumped into that category are fuel-pump pushrods and oil-filter adapters with the right bolts. Occasionally, a re-builder or mail-order house will give you a motor without either of these, and they're the type of parts that you don't think about until the last few steps of the assembly procedure. If you build more than one engine every three years, do yourself a favor and go buy two of each just to have on the shelf. These parts are cheap, especially compared to the aggravation of yet another unscheduled trip to the parts store.



HEAD-BOLT TIPS

When bolting the heads on the engine, always use a head-bolt washer under the bolt, even on cast-iron heads. Also, put a drop or two of oil between the washer and the bolt head. This lessens friction between the bolt and washer and ensures an accurate reading from the torque wrench.



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Engine Tips & Tricks



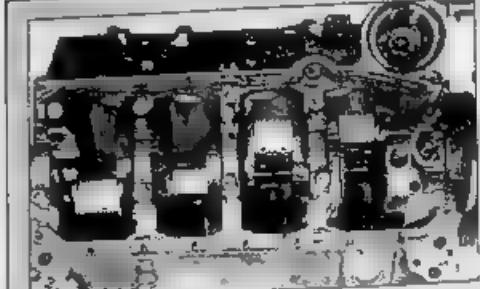
CHECK MARKS

Never assume that the timing mark on the damper is correct. Timing tabs and dampers can be different for the same type of engine in different applications, so always check the mark to make sure it's at TDC. The best way to do that with the heads on the engine is with a piston stop that screws into the spark-plug hole—available from most cam companies and speed shops. Slowly rotate the engine by hand (don't use the starter!) until the piston contacts the stop, mark the damper at the pointer, then rotate the engine the other way until it stops again, and mark the damper at that point. True TDC is exactly in the middle of the shortest distance between the two marks.



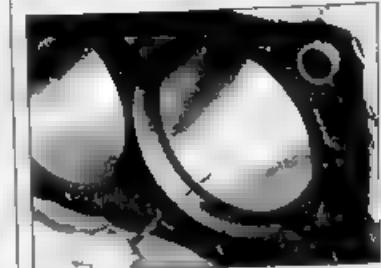
LIFTER ORDER

Old lifters, even those with only 20 minutes of running time, should never be used with a new camshaft. But if the old cam is going back in the engine, the old lifters can be reused. Just make sure the lifters go on the same lobe they came off of, or the cam will be destroyed very quickly. If you still have the box the lifters came in, use it to keep them in order.



GO IN ORDER

When torquing bolts on the caps, intake manifold, clutch plate and so on, make sure to follow the correct sequence. On these main caps, the numbers indicate the order to follow. A similar order should be applied to the intake manifold and any part with a similar bolt pattern. This rule applies to any part on a car, whether it's the engine or the wheels. Also, sneak up on the final torque figure. If it's supposed to be 70 ft-lbs, first torque all the bolts to 30 then 50, then 70.



NO BUTTS

The piston-ring endgap is crucial to engine life. If the gap is too little, the ends of the ring will butt, and the ring will instantly be destroyed. The cylinder wall is usually taken out in short order as well. As a rule of thumb, always have at least .004 inch of ring gap per inch of cylinder bore, and if there's any questions, make the gap bigger rather than smaller. Sources have told us that in dyno testing, the difference in engine horsepower between gaps of .016 and .040 inch on the same engine were insignificant. It's true that blow-by may increase, but better to have a little blow-by than butted rings and broken parts.

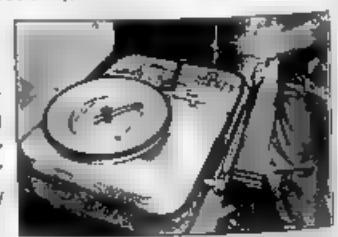
CHECK YOUR CLEARANCE, CLARENCE

Upon receiving an engine from a builder of unknown quality or through mail order, there are a few things you can check that don't require major disassembly. One of the best and easiest is rod side clearance, which is often overlooked in high-volume rebuild shops. Depending on the engine, this clearance is necessary to bleed off oil to lubricate the camshaft and the cylinder walls. Not enough side clearance can cause lubrication problems or excess rod-to-rod frictional wear, and too much clearance can lower oil pressure and cause oil burning. Check the manual for the proper clearance range for your engine. With these types of engines, you should also check the torque on the rod, main and head bolts.



CAN WE TORQUE?

The one tool that you absolutely must have when building an engine is a torque wrench. The click type is by far the most accurate, but the older beam-style will work as well. Also remember that even the best torque wrench can lose accuracy over time, so it should be calibrated every few years or once a year if you use it a lot. Cornerstone Metrology Service in Van Nuys, California (818/902-9551), found that our torque wrench was off by 15 percent.



RING LUBE

Never install piston rings dry! Dry rings will kill themselves and the cylinder wall, so always lube them before dropping the piston in the hole. Engine oil can be used, but it can leave deposits on the ring lands. A better choice is automatic transmission fluid, and an even better choice yet is a dedicated ring lube. Don't drown the rings with any type of lube, just get them good and wet.

PICKUP GAUGE

The pickup in the oil pump should always be about $\frac{1}{4}$ to $\frac{1}{8}$ inch from the bottom of the pan. The easiest way to check this is to stick a piece of modeling clay on the pickup, sprinkle it with some baby powder to keep it from sticking to the pan (but don't let any fall into the engine), and then install the pan with the gasket. Remove the pan, and measure the thickness of the clay. Usually, the pickup is loose enough that you can adjust it by hand, in which case you won't need to use the clay—just force it down with the pan, then remove the pan and tap it down another $\frac{1}{4}$ to $\frac{1}{8}$ inch. It's also a good idea to braze or epoxy the pickup to the pump body to keep it from falling out. If brazing the pickup, remove the pressure-relief spring during brazing to keep it from being affected by the heat.



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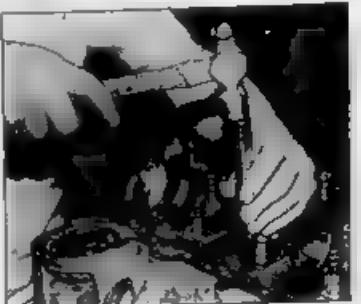
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Engine Tips & Tricks

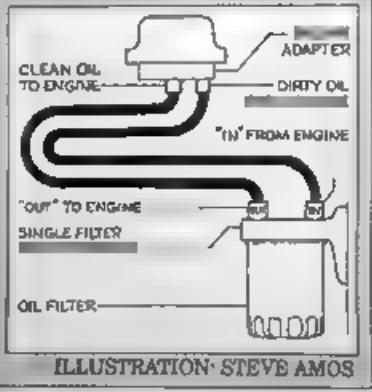


SNUG FIT

The main caps should always fit snugly in the block so that they register to the bore correctly. If they don't, use a punch and peen them into place. The machine shop should have done this already, but always double-check it.

REMOTE FILTER FINESSE

Remote oil filters are often used to gain access for custom headers in engine-swap situations or if engine space is limited, a common problem with kit cars. Plumbing from the engine to the remote adapter should be done with braided-stainless lines or at least high-pressure rubber lines. Also, be especially careful when making the connection from the engine to the remote filter adapter. Most of the adapters use a Ford filter, which utilizes a built-in, one-way check valve in the filter. If you connect the oil-filter adapter backward (oil into the "Oil Out" fitting), the internal check valve will prevent oil from leaving the filter, and you will not make oil pressure. Double-check your connections and make sure you have oil to the top of the engine by pressure lubing the engine before starting.



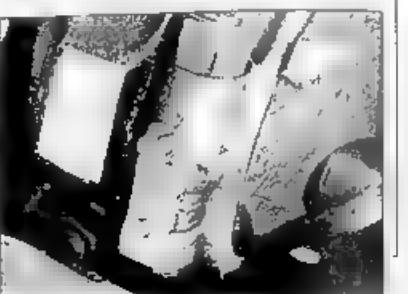
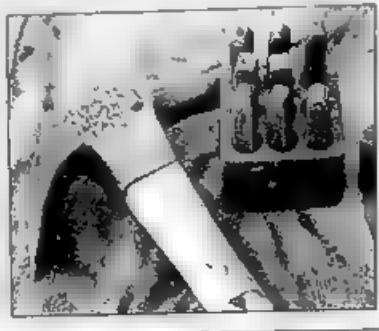
SET THE HEIGHT

Setting valvespring height is a time-consuming affair, but Donnie Anderson at Performance Engineering showed us this trick to ease the pain. The distance between the spring pocket on the head and the bottom of the retainer can vary due to machining- and production-tolerance stackups (sunken valve seats, different retainer thicknesses, valve length and so on). Therefore all the spring pockets should be measured and then set to the height of the shortest one. Once you've determined the shortest one, cut a piece of wire to the exact length, and use it to determine when you've installed enough shims. It's much quicker and cheaper than using a micrometer or depth gauge on each spring pocket. This assumes that the valvesprings are within 20 pounds or so of each other. A spring that exceeds spec by more than this (which usually happens, even in a matched set of springs) should be treated separately.



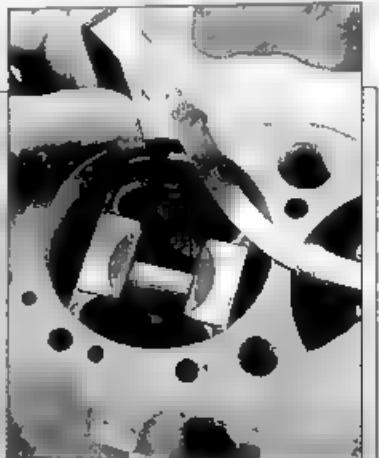
NUMBERS GAME

Disassembling an engine also requires some thought beyond which impact socket to use. If the same rods and main caps are going to be reused, they should go back on the same journals they came off of. To keep them from getting mixed up, number them with a set of punches before removal.



LEAK DETECTIVE

Looking for a cheap way to evaluate cylinder heads for leaky valves? Just invert the heads on a bench with the port openings up and pour in solvent or, in our case, rubbing alcohol used for cleaning chambers. If the valve sprouts a leak, you know it isn't sealed properly. A slight amount of seepage is acceptable. Sometimes you might be able to lap the valves slightly to seal them more efficiently, but a new valve job is the best way to seal those valves and add power. This process works equally well on both intake and exhaust valves. **KC**



FEELINGS

Piston-to-wall clearance is very important for proper combustion-chamber sealing and engine life, but most blueprinting stories or books show how to use a bore gauge and micrometer to check the clearance. If you don't have these expensive tools, a feeler gauge will work. Just make sure you're measuring where the piston manufacturer dictates.



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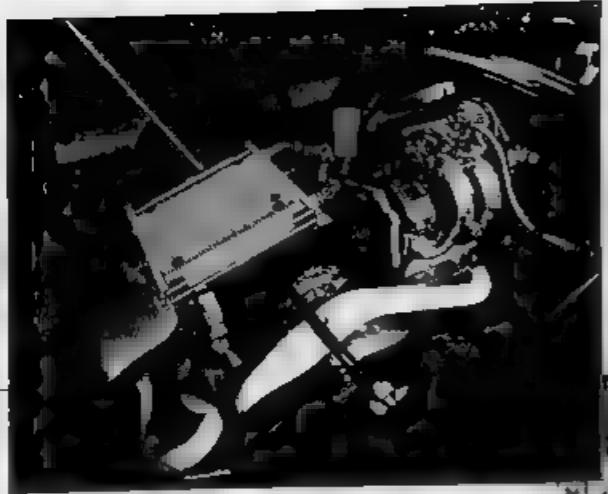
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Spyder Man

Bill Barton's Beck 550 Spins a Whole New Web

By David Fetherston



PHOTOGRAPHY
DAVID FETHERSTON

When Chuck Beck saw the potential in the Porsche 550 Spyder kit from the Porsche 550 Spyder kit, he knew that it would be one of the best kit cars of all time. Even more interesting are the individual owners, such as Bill Barton, who have added innovative improvements on the original Porsche concept. Barton purchased his Beck Spyder as a kit in 1981 and has recently finished it. Most folks would have taken at least time to build one of these kits, but Barton had a few other projects going on, including a two-passenger kit plane. And he wanted to do something really different.

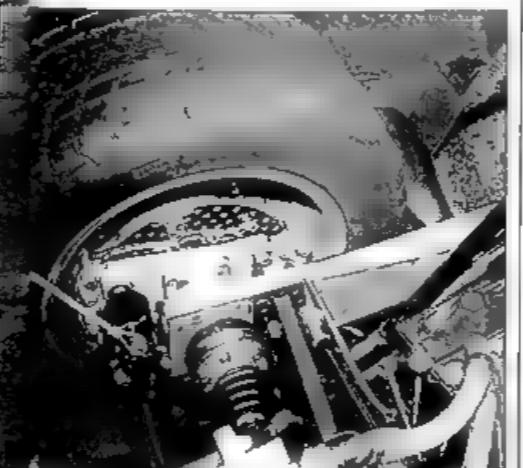


Bill's 550 Spyder is not to be confused with the stock Volkswagon. Instead, he modified a Mazda rotary engine to run in a transaxle and created an independent rear suspension of his own. He did this with disc brakes. He also wanted to run wider wheels, which meant he would have to modify the bodywork.

Barton is an engineer by trade and possesses a thorough knowledge of how to transform his ideas into plastic and metal and make them work. He began with the mechanical modifications after purchasing a new Mazda 13B engine and a rebuilt 914 transaxle. He mated these together with a Kennedy Engineered Products adapter kit and fabricated new engine and transmission mountings. Rotary Reliability and Racing street-ported the motor, added a breakless ignition and high performance coils, and installed a Mikuni inlet manifold and a dual-throat side-draft 44mm Mikuni carburetor equipped with a wide-mouthed air cleaner. Barton fabricated the header exhaust using Racing Beat parts and capped it with a special cross-mounted stainless steel muffler, which sits behind the transaxle.

The exhaust on a rotary engine is quite hot and its red glow can melt or even ignite a fiberglass body unless some shielding is used. Barton went to some pains to install the shielding correctly. The compact powerplant puts out 180 hp in this configuration, about three times the output of the stock Type I commonly found in this kit.

Next came the cooling system, relatively simple in concept but neatly



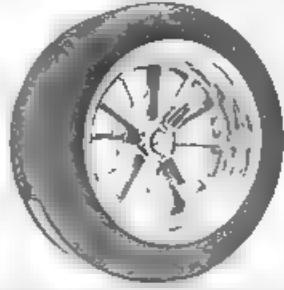
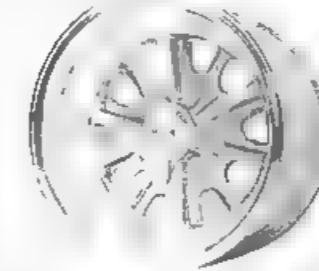
Barton didn't skimp on his custom independent rearend. The disc brakes are from Neal and the trailing arms are billet aluminum.

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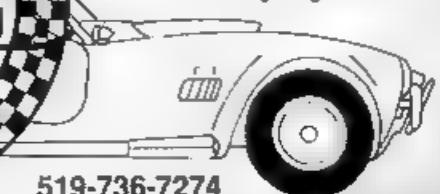
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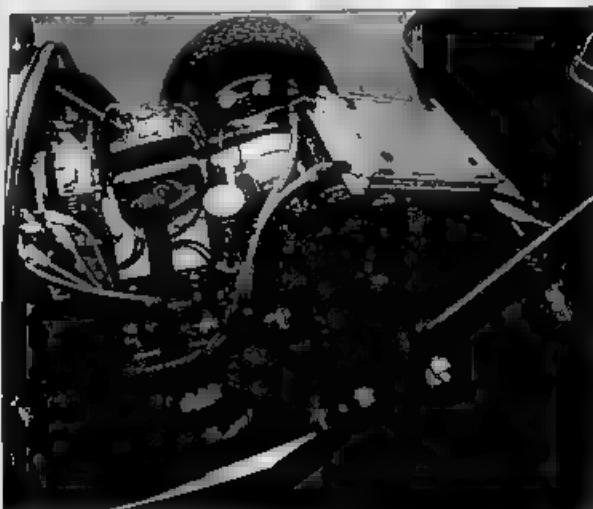


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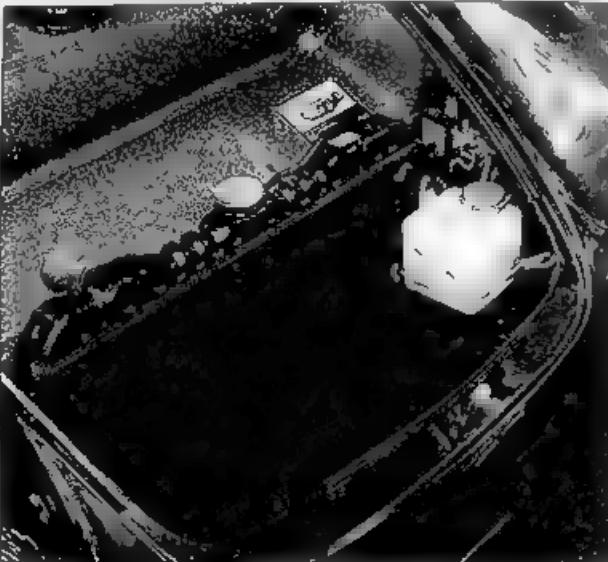
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Spyder Man

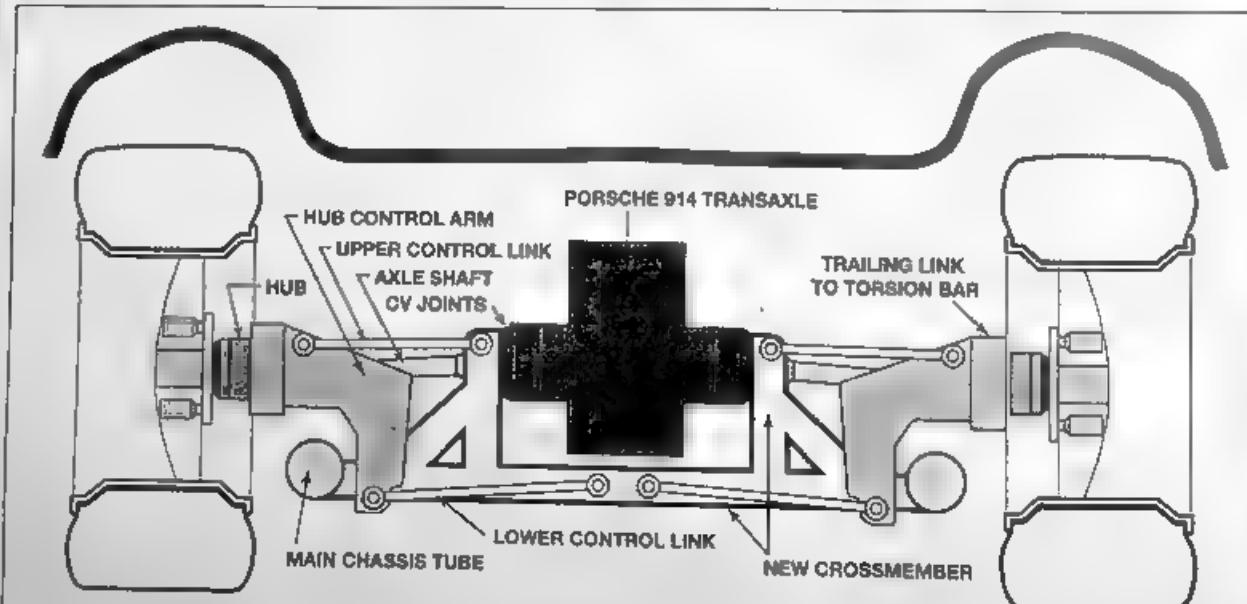
engineered to complement the body-work. The liquid-cooled rotary is just like any regular piston-powered engine and requires a radiator and several gallons of coolant. However, cooling is particularly important for



Because rotaries are sensitive to overheating and put out a lot of heat in the exhaust system, an oil cooler is a necessity, as is shielding on the pipes to prevent the fiberglass from melting.



With a few modifications to the spare-tire well, the radiator fit neatly under the front hood.



Barton used a computer to work up the design of this custom independent rearend. The center section is a Porsche 914 transaxle, but the links and the hub carriers are custom pieces.

over the front suspension both naturally and with assistance from electric fan. Since the rotor is a rotary engine is oil-cooled, it is also necessary to have an oil-cool fitted to the top of the engine, where air flows out through the rear hood vents. Again, this cooling system is critical to ensuring a long engine life.

Once he had the engine mounted and the cooling system worked out, Barton took the measurements to design his new suspension on his Computer-Aided Design system. This was not a simple project, but it did evolve a functional new layout that works very well. The suspen-

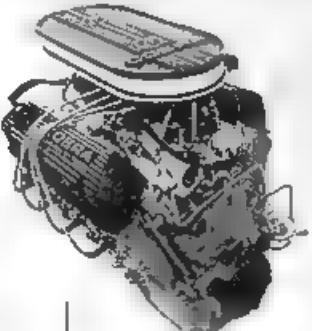
sion is stiffly sprung off the Beck's torsion bar and trailing-arm setup, but Barton created new trailing arms out of billet aluminum that don't twist like the spring plates on the original design. He also removed both sway bars because he found the suspension was much more compliant without them, allowing the 550 to understeer slightly. The design also required the building of a crossmember so that the new upper and lower control arms and the links could pivot vertically with the hub control arm. Barton created the final drive using new carrier hubs made of aluminum with VW spindles and bearings, custom-length CV-jointed driveshafts and Neal disc brakes.

The front end is simple stuff by comparison, using a lowered late-model VW ball-joint suspension and VW disc brakes. The wheel package was set out with 15-inch alloy wheels, 7 inches in the front and 8.5 inches in the rear. These are capped with 205/50ZR tires in the front and 245/50ZR tires in the rear. Barton also had to redesign and fabricate a new emergency brake and shift linkage.

The body came next, and its stunning fat fender flares are perfect. It took Barton six weeks of mostly full-time effort to get them done. He crafted them like a surfboard builder, shaping a foam core and glassing the outside when he had the shape right. The edges are rolled and beaded, and the flare runs into the 550's rounded body-work just as they were designed in Stuttgart, Germany. Barton built them so well he can lift the rear engine cover up and down without



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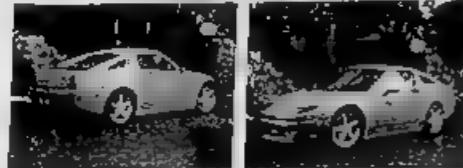
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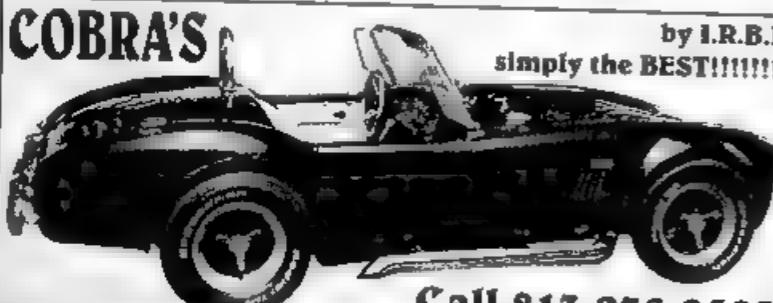
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Spyder Man

fear of cracking it.

Not one to do a less-than-perfect job, Barton set to getting the interior just right. He sized up and fitted the rollbar, making trim bezels to sit where the body meets the rollbar tubes. He finished off all the inner panels, the brakes, the windshield installation, the wipers and the trimming with the help of Jon Drechney, who had wired, plumbed and done all the welding on the 550. Inside, Barton fabricated seat tracks and seatbelt mounts right into the frame to carry fiberglass reproduction Speedster seats. The dash is trimmed out neatly with a set of late-model Porsche VDO gauges, including a 150mph speedometer. A Grant leather-bound steering wheel directs input to the steering.

Finally, the body was treated to a coat of BMW Calypso Red (Du Pont urethane) with Chroma Clear finish. Barton color-sanded and buffed this all out to a high luster.

Whichever way you slice it, Barton's 550 is a fabulous piece of work. From nose to tail and from suspension pieces to fender flares, it's all fine craftsmanship. Barton gets quite a kick out of driving the Beck because it not only runs as quick as a jungle cat but also confuses some folks with its unique lines and exhaust note. Barton just smiles and moves on, knowing he's one special Spyder man. **KC**

SOURCES

Beck Development
Dept. KC07
1531 W. 13th St., Unit E
Upland, CA 91786
909/981-3840

Kennedy Engineered Products
Dept. KC07
38830 17th St. East
Palmdale, CA 93550
805/272-1147

Rotary Reliability and Racing
Dept. KC07
2608 S. Harbor Blvd.
Santa Ana, CA 92704
714/839-8018

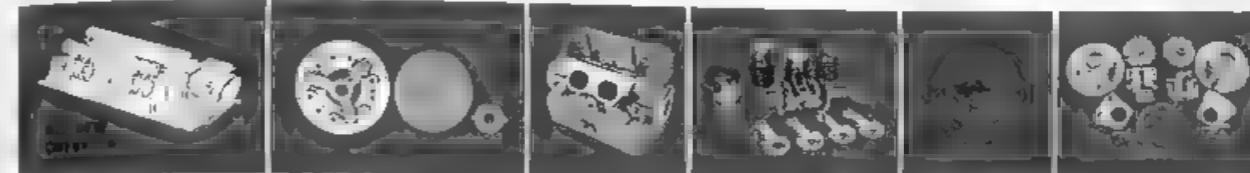
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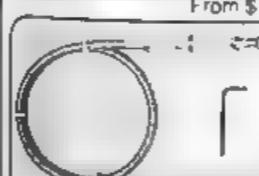


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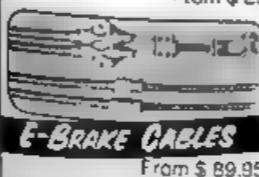
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By Joe Greeves

West Coast's replica certainly looks Cobra, although the price comes to mind. It also sounds certain like one, but it's a little smoother riding. Apple accommodation and interior performance. Handling is 100% on the road to handle the road. The car is the best of them. But the goal here is luxury, rather than performance alone.

What prompted Vern Redel of West Coast to modify tried-and-true original? When he began, he redid the traditional Cobra in the late '70s, he wanted to address a number of comfort and safety issues he'd discovered on other replicas. Starting with an old West Coast body, Redel began cutting and fitting until he arrived at one that would comfortably fit his 3-foot frame. Increasing 2 inches wider at the rear forced him to widen the rear track. The West Coast's rear track is 17 inches, but the front track is 16 inches. The 26-inch 36 series tires and 16-inch 40 series are used up front. The wheelbase is 90 inches longer than the 90-inch standard. The body is 10 inches wider than the original. The drop-top frame

with a 4.6L engine took less than three months to build. Wind tunnel tests were done before the final design was made and as a result the nose of the car was moved back and lowered 1 inch for better stability at high speeds.

For increased safety Redel developed a tubular spaceframe, TIG welded with a double-walled driveshaft tunnel and floorpan. To this he added twin side guard beams in the doors, extra chassis members below the doors, crumple zones fore and aft, and a full-width frame-mounted rollbar. He also positioned the Kevlar fuel cell above and forward of the rear bumper. The car's Ford steering and suspension components include Pinto A-arms in the front and a 9-inch rearend with a four-link setup. Adjustable Konis offer either race-track handling or a boulevard ride at the twist of a dial.

Most West Coast cars are equipped with a 460 Ford engine and a B&M shifter on the C6 automatic transmission. An automatic in a Cobra? Why not? A number of original Cobras had this feature. On West Coast's replica, it's just another part of the performance/opulence philosophy that separates the West Coast from other Cobra kits. After making it longer, wider and safer, Redel factored in an air of luxury not normally associated with this type of replica.

Although certainly proud of the acceleration and speed records his cars hold, Redel eschews the performance-only approach of other replicas. Yes, his Cobras go fast, but that's only part of the story. The 90-inch stretched wheelbase provides a more stable platform, giving a smoother ride and getting better traction from the longer bars in the four-link suspension. Also, the wider wheelbase and fatter tires are designed to increase cornering stability.

Purists may deplore this lack of authenticity, but then again, why replicate faults? The original Cobra

was cramped, hot and had some handling problems as a result of its antiquated chassis. The West Coast, on the other hand, has distinct advantages for someone wanting a genuine daily driver side-impact safety, a comfortable ride, an insulated double-wall tunnel and foot boxes, plush door panels with pockets, tilt steering, a 10-instrument cluster in a burled-elm dash, an AM/FM stereo, space for three pieces of luggage and more.

Obviously the West Coast is not your father's single-purpose Cobra. It was this combination of styling, safety, speed, luxury and stretch-out room that prompted Carl Bobeck of Parma, Ohio, to buy his first West Coast Cobra in 1991. He enjoyed the modernized and homogenized Cobra concept so much that he returned two years later to Andy and Dan Fiffick of A.C. Exotics and had them assemble a second ultraplush version shown here, incorporating even more performance and luxury touches.

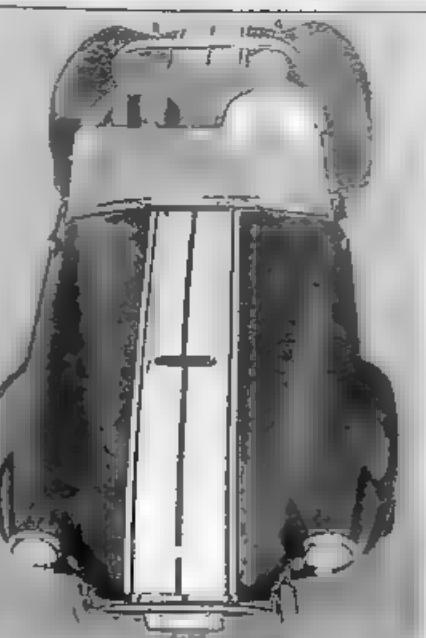
A standard West Coast kit, which includes a wired and plumbed rolling chassis, starts at \$21,950. A partially completed vehicle, less the motor and transmission, costs \$32,000 and includes wheels, tires, a paint job and an interior. For \$49,950 the Fifficks will furnish a turn-key car with a 4-bbl 460 Ford, a C6 automatic trans, a B&M shift kit, power rack-and-pinion SVO steering, power ABS, BFG T/A radials on Center Line or Dragstar wheels, an AM/FM stereo and more. Bobeck's car is loaded with a raft of performance items, and virtually everything on the built 460 is polished or chromed. Custom features include 17-inch Boyd wheels with Pirelli tires, a tilt column, a MOMO wheel, an AM/FM/cassette stereo, a chrome dash and more. The car was completed in about three months at a cost of approximately \$65,000.

There are several distinctive touches on Bobeck's car, the most obvious of which is the hood-scoop. In order to make room for the

SOURCES

A.C. Exotic Cars, Inc.
Dept. KC07
12955 York Delta Dr., Unit J
Cleveland, OH 44133
216/582-5444

West Coast, Inc.
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6785 16-Mile Rd
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Secondhand Stuff

How to Buy Cheap Parts for Your Project

By Jeff Smith & Cole Quinnell

Experienced kit builders already know that the least-expensive way to assemble a project vehicle is with used parts. And the better shopper you are, the better the condition of the components you choose and the less work you'll have to do or pay to have done. So we decided to

compile a few tips and tricks to help you scrounge for recycled goods. Sources for used parts and pieces include newspaper classified ads, friends and acquaintances, swap meets and salvage yards. Machine shops can be the least-expensive and best-quality places to purchase abandoned engines or parts. We've broken the various parts into categories so

you can quickly scan for suggestions on the stuff you need.

Playing the used parts game is a little like walking through a mine field in the dark. The best path is with a flashlight and the experience to know where the bombs are buried. Our story provides your pocket flashlight. The rest is up to you. Good luck and good hunting!

TRANSMISSIONS

We'll split gearboxes into automatics and manuals. Identifying a transmission can be half the battle. To give you an idea of the complexity, there are at least 14 different automatics and more than 20 different fourspeeds (not to mention intermodel variations) from the Big Three automakers, and that doesn't include aftermarket transmissions. But assuming you can quickly spot a TH700-R4 out of a stack of TH350s, the next step is to be able to pick out the gems from the lemons.

The first obvious test is to inspect the fluid. If it's pink and doesn't smell burned, it's probably satisfactory. If it's a ruddy brown color and smells like the first meal you seared in a frying pan, you'd best look elsewhere. Pulling the oil pan is always informative, but that's messy and difficult

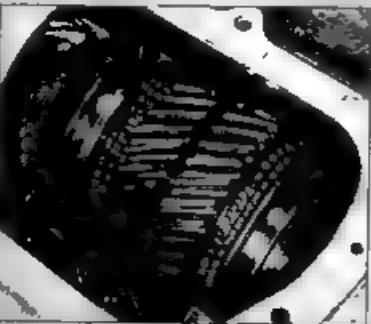
Also look for obvious wear patterns on the input shaft and torque-converter drive yoke. Otherwise, it's tough to evaluate an automatic unless it's still in the car.

Buying used torque converters is such a black art that we'd suggest staying away from them unless you are familiar with the piece and know its history. There's no way to estimate stall speed by looking at a converter (other than by its size, which is hardly accurate). Also, there's no good home-brewed method to predict converter quality without cutting it apart. We'd suggest avoiding the used-torque-converter market. Nothing will destroy a good automatic faster than a junk converter.

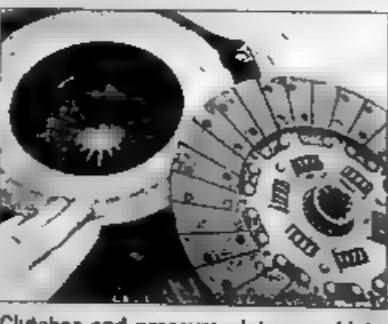
Manual transmissions offer greater potential purchasing success since side covers are easier to remove to inspect the inner workings of the gearbox. Look for obviously chipped or missing teeth, especially on the input-shaft gear and

the cluster gear, which is the large one-piece gear at the bottom of the case. Also look closely at the brass synchro rings for damage. Even though there may be no obvious damage, assume that the gearbox will need freshening.

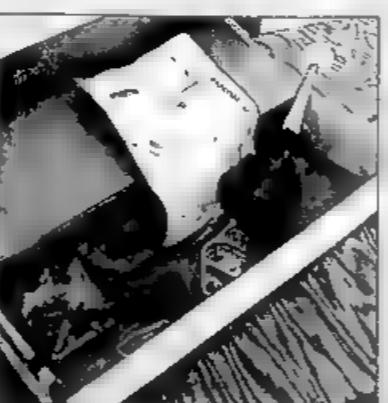
Related items such as shifters are also attractive used buys, but beware of the application. There's no way to know if the small parts are all matched for a given application, especially with manual shifters. On the positive side, Hurst offers a rebuild service for used Hurst shifters. For a paltry \$40, Hurst will completely rebuild the shifter and tune it up. At the very least, you should consider buying an instruction sheet (each one has a separate part number in the Hurst catalog) to help with the installation. That can save a ton of headaches when it comes time to bolt on the shifter.



Manual transmissions should be closely inspected for gear damage or abuse. Look for worn or rounded synchros and chipped teeth. Keep in mind that cluster gears and cases for Muncies are becoming extremely rare. If the trans is in a pile of parts, you'd best pass.



Clutches and pressure plates are high-wear items, but if you find a set that's still good, they can be a good investment. Look for broken or uneven-height pressure-plate fingers and uneven wear or cracks in the clutch disc. If you buy a used clutch, install a new throwout bearing. Never buy a used throwout bearing no matter how cheap it is.



The problem with used manual shifters is that there's no guarantee that the shifter is designed for your application. If you're not sure, ask the seller to specify the application.

ENGINES

Used engines can be divided into two groups. First is the assembled "stab-in" type that the seller would like you to believe can be spray-can rebuilt, stabbed into a car and driven. The other kind is somewhat disassembled and will require rebuilding. The latter category is often preferred because you can more closely inspect the components. Since you're planning to rebuild the engine, it will work for your purpose so long as it isn't cracked or worn beyond use.

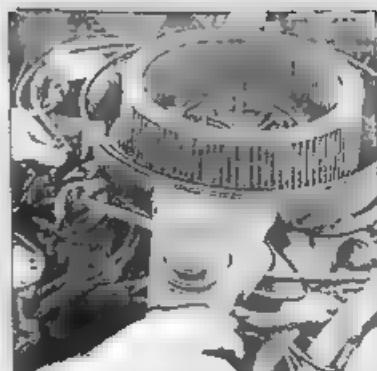
Of course, completely disassembling the engine and checking it out with precise measurements is the best way to avoid getting gypped, but that's usually not realistic. The seller is seldom open to allowing you to disassemble the engine for inspection further than he already has, and you may not own the measuring tools required. Instead, you must be able to estimate the engine's condition using some basic guidelines, shown in the accompanying photos. These tips don't require expensive tools, and knowing what to look for and being a little suspicious can help you cart home a good deal.



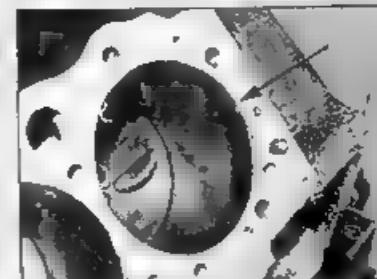
The best way to buy a complete engine is in a running car. Check the oil to verify that it is in decent condition and a standard weight. Knocking rods often can be quieted by running 50-weight oil. Also, let the engine heat up, since that's when cracks will be more obvious.



Erratic needle movement of a vacuum gauge hooked to the carburetor can indicate poor intake-valve sealing. Also, use a compression tester to see that all the cylinders are in similar operating condition. A cylinder with 40 psi less than the others typically means trouble.



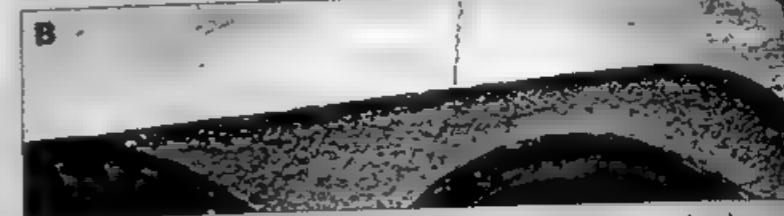
If the engine has a PVC system, check the breather tube and the outer edge of the air cleaner for oil. A very small amount of oil is acceptable, but any more indicates a blow-by condition. Also, check the spark plugs for signs of oil.



Check all of the cylinders for signs of galling or excessive wear. If a cross-hatch pattern is visible on the cylinder walls, then the engine has either not seen many miles since its last rebuild or the cylinder is too big for the piston. You can also formulate a guess about the time since the last rebuild by the size of the ridge (arrow) that has built up at the top of the cylinder. A small ridge, new pistons and a fresh crosshatch pattern can mean a really good deal.



If the heads have been removed, you can better assess the engine's wear and condition. Light carbon buildup on the pistons is to be expected. Cleaning the top of one of the pistons should reveal an over-bore size if the engine has been bored. This one showed a TRW PN and a 0.30-inch over-bore, so the block won't be very useful if it requires another bore.

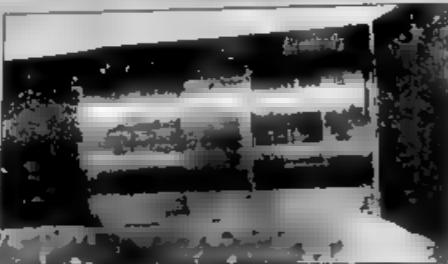


Purchasing used cylinder heads offers the opportunity to very closely inspect the head. To accurately identify the head, the best procedure is to look for the last three numbers of the casting number (A), in this case 492. For used heads, inspect the combustion chambers very closely. Hairline cracks such as this one (B) in the combustion chamber are difficult to see unless you look closely. Also, look for cracks between the valves.

Secondhand Stuff

REARENDS

Treat third members just like manual transmissions in avoiding the junk stuff. Take the time to remove the inspection cover or pull the third member out of the housing. That's the only proper test to tell if the rear is equipped with a limited-slip or merely an open differential. With stock GM gears, look for the tooth count stamped in the ring gear to verify the gear ratio. On other models, count the teeth, and check them for damage in all cases. Also look for cracked suspension-mounting flanges and bent or warped tubes. If the rearend has been seriously welded, assume the axle tubes are warped, which will destroy the axles in short order.



Rearends can be quickly disassembled for inspection. On GM 10- and 12-bolts, the axle shaft is actually the inner bearing race. If the axle looks like this, with obvious worn areas, it needs replacing.

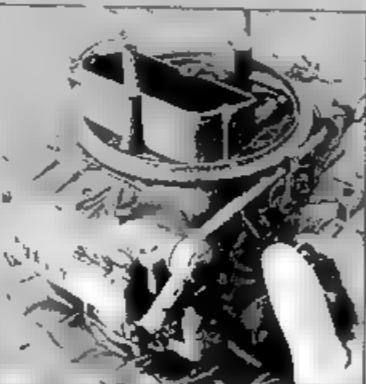
CARBURETORS

Used carburetors can often be purchased cheap—sometimes as little as \$5 will net you a complete Quadrajet. If nothing else, that's a great price for spare parts and metering rods. While there aren't many moving parts in a carburetor, there are still pitfalls to be avoided. We'll deal with two of the most popular carbs—the Holley and the Q-jet—but the same warnings apply to any previously owned carb.

If you plan to buy a used Holley, memorize the part numbers stamped in the choke housings of most Holley carbs. For example, a 4777 is a 650 cfm, a 4779 is a 750 double-pumper and the most common 3310 is a vacuum-secondary 750. Next, inspect for missing parts and a cracked or broken baseplate (which is a common prob-

lem). You should even pull the bowls off to look for internal damage. Also check the primary throttle shaft for sloppiness. It could indicate that someone used a clutch return spring for a throttle spring and damaged the throttle-shaft bushings. Outfits such as Holley and The Carburetor Shop offer a rebuild procedure that costs much less than a new baseplate.

With Q-jets, your biggest concern is to choose a carburetor that doesn't leak. Most of the early Q-jets of pre-'74 vintage (especially the Carter-built models) suffer from porous main carburetor bodies that will seep fuel into the intake. Since there's no way to check for this malady, you're really on your own. Other than checking for missing parts or damaged throttle shafts (again repaired through The Carb Shop and others), the Q-jet market is wide open.

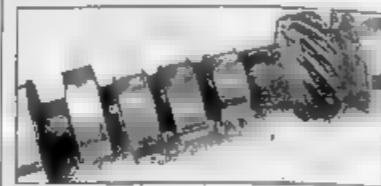


Early Q-jets (left) are more of a risk than their late-model counterparts (right). The easiest way to identify the later carb is its integral choke. The newer models offer better casting quality and can easily be modified into great street carburetors. Keep in mind that most Q-jets are rated at 750 cfm.

Holleys with lots of miles usually suffer from loose primary throttle shafts. Some carburetor shops can repair the loose bushings and even recolor the carb for less than it costs to buy a new one.

CAMSHAFTS

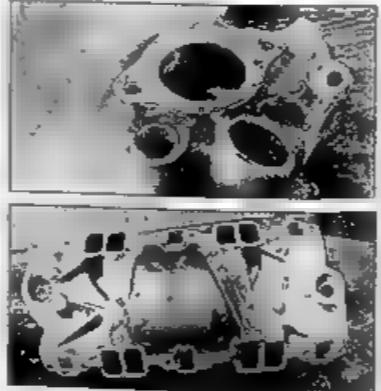
This advice is simple: If you know the cam came out of a engine, you've kept the lifters in and you've had your hand on the cam the moment it came out of the engine, don't buy it. New camshafts and lifters are inexpensive enough to make used cams too risky, especially since installing them is such a hassle. Basically, there's no good reason to buy a used cam when you don't know its history. The only possible exception might be roller cams but they're risky too.



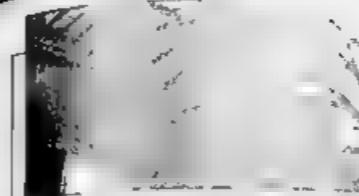
What can we say about a used cam? Unless you know every infinite detail about it, we'd suggest passing.

INTAKE MANIFOLDS

Even with no moving parts, you can still get burned buying a used intake. Never buy an aluminum intake unless you look at the thermostat mounting area. Alloy intakes always corrode at that spot, so take the time to remove the thermostat housing first. Then check for warped mounting flanges and stripped holes. Question yourself about the specific intake you're considering. For instance, will a high-rise intake fit under your hood? And does the intake have the proper carburetor flange to mount your carburetor? What's crucial is not the quality of the part, but whether the application is correct for what you want. Don't buy something just because it's cheap!



All used aluminum intake manifolds rot in the same place—right under the thermostat housing. Always check that area first. If the intake is a stocker, be sure to remove the heat shield and clean the area before bolting the intake onto your engine.



Used rubber can be a money saver if you're careful to select tires that haven't been abused. Look for internal puncture repairs if the tires are unmounted. Also, inspect the tread for uneven wear or cord separations that will show up as wear spots. Also keep in mind that much more than 50 percent of tread life is in the last half of tread depth due to reduced tread squirm.

TIRES AND WHEELS

Most kit builders buy wheels based on appearance. That's OK, but you need to be aware of width, and especially backspacing, to make sure they fit your car. Look for hairline cracks or damage to the rim edges. Be careful if they've smacked a curb. Polished-aluminum wheels that have lost their luster can be purchased very cheaply. You can then brush-finish them and give them a whole new look. Flat-faced wheels such as the original Center Lines or the Cragar Super Lites are a natural for that type of treatment. Of course, you should make sure the bolt pattern will fit your car.

Buying used tires is a tricky game since some tread and sidewall damage is difficult to spot. Also, serious out-of-round problems are impossible to determine until the tire is mounted. On the other hand, factory almost-new takeoffs found at some high-performance dealerships can be a steal. Your best bet is to buy matched sets of tires and wheels already mounted. Chances are good that they will be roadworthy. **KC**

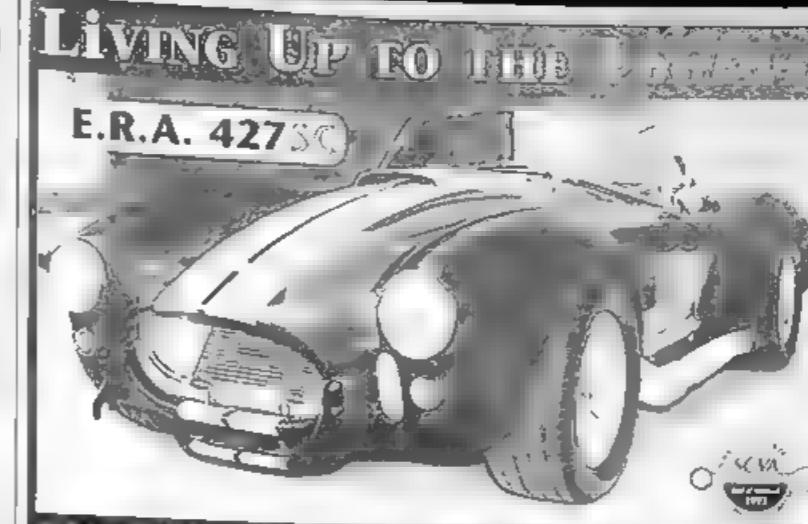
SOURCES

The Carburetor Shop
Dept KC07
1457 E. Philadelphia, Unit 24
Ontario, CA 91761
909/947-9722

Holley Performance Products
Dept KC07
P.O. Box 10360
1801 Russellville Rd
Bowling Green, KY 42102
800/HOLLEY-1

Hurst Performance
Attn: Hurst Rebuild Department
Dept. KC07
8700 Brookpark Rd.
Cleveland, OH 44129-6899
216/398-8300

MSA-1
Dept. KC07
PO Box 168
Pleasant Hill, MO 64080

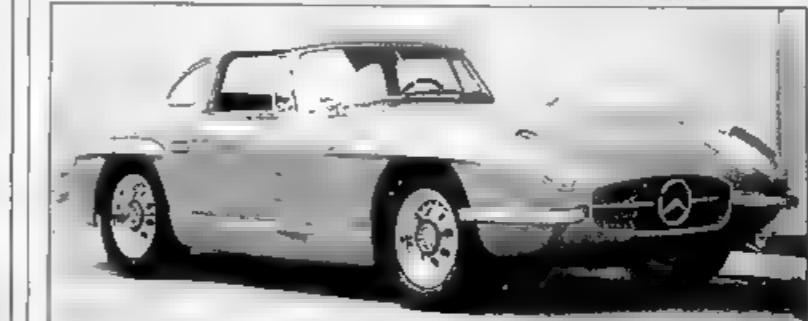


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By Jim Youngs

As sad as the story of the ill-fated Jaguar XJ13 project racer may be, Predator Performance's loving recreation of that beautiful car is exciting and pays wonderful tribute to a stillborn dream of the distinguished leaping-cat marque. The brief history of the Jaguar XJ13 project is a case of too little too late. Some accounts of the one-and-only race car's genesis point to about 1955, but work on the car didn't begin until mid 1965, with completion in early 1966. Yet the beautiful mid-engined Jag wouldn't see any testing until March 1967. During this development period, sport and GT racing and technology advanced at a rapid pace, so much so that the XJ13 was obsolete before it was ready to hit the track.

For several reasons, Jaguar brass wisely decided not to compete. The development was not totally wasted because a toned-down version of the XJ13's V12 engine eventually made its way into E-type road cars, while the still-secret race car resided quietly under a dust cover in a corner of the Jag development shop.

Three years later, the XJ13 was dusted off to star in a film to herald the introduction of the Jag V12. After the filming of Norman Dewis skillfully guiding the mystery Jag on the banking of the Motor Industry Research Association (MIRA) test facility, a tired wheel gave way at high speed and this one-of-a-kind car hit the retaining fence atop the bank then ricocheted and tumbled into the plowed infield. Dewis walked away, but the Jag's body was demolished

Although the central structure was still in good shape, the car was once again hidden under wraps.

The damaged XJ13 was eventually rebuilt and shown to the public for the first time in 1973 at the British Grand Prix. The handsome racer survives today, albeit as a museum piece at the Jaguar Browns Lane Factory. It has also gone on tour and appeared

in the United States in recent years.

Predator Performance's Daniel and Lawrence Ligas are quite familiar with this intriguing bit of Jaguar history, since the brothers are just about as absorbed with the marque as you can get. Not only do they produce exacting replicas of XK-D type and XKSS '50s Jaguars (see "On the Prowl," July '92), but they each also

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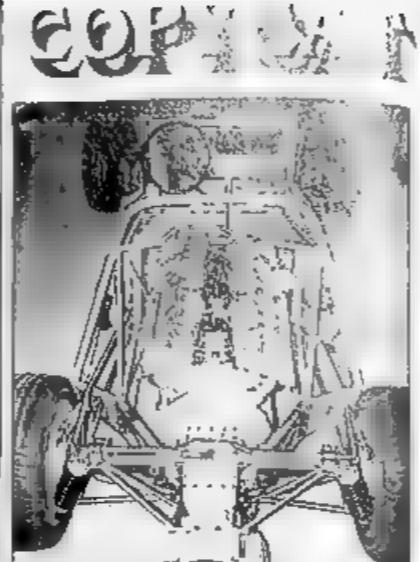
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Underneath the exotic skin is an equally exotic custom spaceframe with Jaguar suspension pieces and a ZF transaxle from a Pantera.

have more than 15 years of experience in Jag restoration. In addition, their business includes ground effects and special accessories for Jaguars and V8 engine conversions.

The Ligas brothers are proudest of their newest creation, the XJ13, and justifiably so. It is an even more impressive project when you consider that it was done from scratch and not splashed off the only authentic vehicle in existence. Relying on photographs, historical material, a Matchbox-size model and measurements of the original car taken during its tour of the U.S. show circuit, Predator managed to form a faithful body that is as beautiful as it is different when viewed from any angle. The molds and the tooling were meticulously crafted by Christine Buehler, as was this first body to come out of the mold.

The hand-laid fiberglass body is mounted and bonded to a mild-steel tubular spaceframe. Predator called on Tom Owen, a Canadian Formula 2000 race-car designer and builder, to help with the chassis design and the suspension geometry. The rear suspension consists of a four-link system with Heim joints attached to Jaguar XJ-40 hubs and halfshafts mated to a remanufactured Pantera ZF transaxle. The oversize Dunlop 335/35ZR17s mounted on 12x17 HRE alloy wheels are kept on the ground by Aldan Eagle coil-over shocks.

Up front the suspension setup employs Jag XJ-6 upper and lower A-arms, spindles, rotors, calipers and hubs. The steering rack is a TRW Mustang II configuration, and Aldan coil-overs are also used. The front

footpads are provided with Dunlop 245/45ZR17s mounted on 9x17 HRE wheels.

An V-12 replica just wouldn't be the same without a V12 powerplant. The original XJ13 engine was a 5.0-liter V12 with four overhead cams. This developed only 502 hp, a little shy of what Jaguar felt was needed to compete at Le Mans, especially considering Ford's 7-liter GT40 assault. In this first replica, Predator installed a V12 from an '85 XJS measuring 5.3 liters of displacement and churning out about 400 hp. Internally, the engine was fitted with XM-3 lsky cams, and the rest of the guts remained stock for the rebuild. Six Weber 40 IDF carbs sitting atop a Weber downdraft manifold feed fuel from the twin 8-gallon stainless-steel fuel cells to the cylinders.

The interior of the Predator beast is race-car serious in nature and skinned in 030 aluminum sheet. Leather and cloth upholstery covers the custom alloy bucket seats. The deep doors have a side-impact steel beam through the center to complement the crush zones incorporated into the chassis. Predator kept the dash simple as well with a wood-rim Grant wheel and Classic Instruments' Elan GT-series gauges. Quite unlike the original, this replica features a Danhard heat and air-conditioning system and a DOT-approved windshield. The rear window, the headlight covers and the engine cover are molded Plexiglas.

If you crave this replica piece of racing history as much as we do, it is available in kit or turn-key form, but be prepared for a great deal of exclusivity. The \$30,000 base kit (without the drivetrain) includes the fiberglass body with an internal spaceframe, the painted chassis with all mounting brackets installed, a DOT safety-glass windshield, a rear window, an engine cover, headlight covers, a Targa top assembly, a dash

blank and some aluminum bulkheads. Additionally, the doors, trunk and hood are hinged and installed. Predator can supply virtually all that is necessary to finish a home-built XJ13, including Jag front and rear suspension components, a ZF transaxle, a V8-engine adapter, an engine, a fuel system, a cooling system, a wiring harness, a clutch, an A/C system, a complete brake assembly and other necessary components.

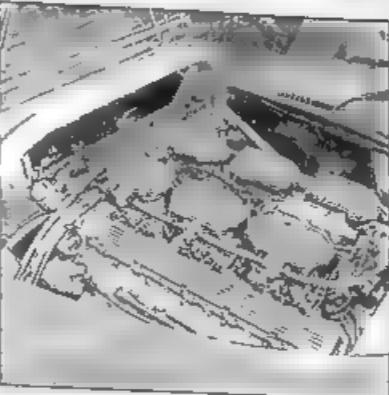
The car featured here is just an example of what can be done. While a turn-key vehicle starts at a base price of \$115,000, the one shown costs \$125,000. After hearing the big V12 bark to life, we were already fumbling with our wallet for deposit money, but alas, the credit line is insufficient. Components for this replica are typically not of the budget variety: Just the refurbished ZF transaxle costs about \$6000. Still, we can dream, can't we?

Jaguar automobiles have always garnered respect and admiration, so imagine what it would be like to have a legendary car that most people have never seen in person. To many, owning something as rare as

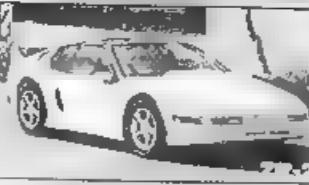
a Jaguar XJ13, even if it's a replica, is a sound investment and a distinction that only a relative few will ever achieve. KC



In the spirit of the original racer, Predator kept the dash treatment simple with a Grant wood-rim steering wheel and Classic Instruments' Elan GT gauges.



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KIT TECH

By Jim Youngs

FIBERGLASS PROJECTS

In the September '94 Kit Tech, Bill Streeter of Omaha, Nebraska, wrote that he wanted to build a fiberglass body, and you recommended *How to Build a Custom Fiberglass Body* by Sunny Walicki of Sunny Auto Motion Show Cars. Is this book or manual still in print? I thank you in advance for any help you can give me. I love reading *Kit Car* Keep up the good work.

Raymond Hernandez
Dania, FL

I am a new reader of your magazine and must compliment you on a fine publication. I really enjoy the feature articles and photographs of the newest kit cars. I would like to know how I can produce a fiberglass body of my own design. I was especially interested in L.A. Exotics' Coremat-reinforced, color-gelcoated body as mentioned in your March '95 issue ("Scarlet Fever"). What would I need to do to take my design to a mass-produced finished body? Could you recommend any literature or companies to contact? Any help would be greatly appreciated.

Michael Walsh
Millwood, NY

Building your own fiberglass body is an ambitious project, but it's not impossible



You'll doubtless find this issue's coverage of fiberglass tech useful. Sunny Walicki's book *How to Build a Custom Fiberglass Body* (send \$19.95 plus \$3.50 shipping to Sunny Auto Motion Show Cars, Dept. KC07, 408 Maiden Ln., Pleasant Lake, MI 49272) is about as good a place as any to start. The book covers the one-off sandwich construction method, which doesn't require any plugs or molds. We also suggest taking a look at *Glass Fiber Auto Body Construction Simplified* by John A. Wills (Westwood Publishing, Dept. KC07, P.O. Box 162, Haverford, PA 19041,

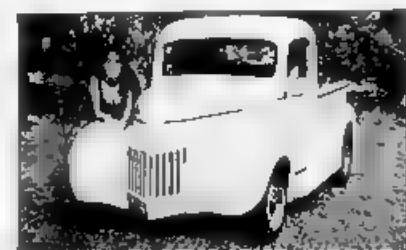
610/896-3952, ext. 17). Another publication that contains a wealth of information on the fundamentals of fiberglass layup, core materials and advanced materials is the 400-page book *Fiberglass Boatbuilding for Amateurs* (send \$27.95 plus \$3.00 shipping to Ken Hankinson Associates, Dept. KC07, P.O. Box 272, Hayden Lake, ID 83835, 208/772-5547).

KIT TRUCKS?

After reviewing your magazine for a couple of months, I feel a strong desire to attempt a kit car. From your recent issues, I see that there are many available. I have made contact with Fiber Jet Industries for more information on its Sand Hopper, something simple to start with. But what brings me to write is why do we not see any kit trucks? Are none available? Could this be an untapped oil well? If you know of any companies, could you please list them for me?

Rob Haun
Seymour, TN

Given the exploding interest in sport trucks these days, we're also surprised



that there aren't many kit trucks. Certainly there are plenty of add-on goodies to transform a stock pickup into something special, but we haven't seen many complete kits. However, we have heard about some truck kits available from U.S. Body Source (Dept. KC07, Star Rt. 1, Box 800, Hampton, FL 32044, 904/468-3303). Using an '83 or newer short-base Ford Ranger as a donor vehicle, the company offers bodies for a '41 Willys, a '51 Studebaker truck, a '28 Ford panel and a '40 Ford panel. There's even a Cobra body kit that reportedly fits on this donor truck and

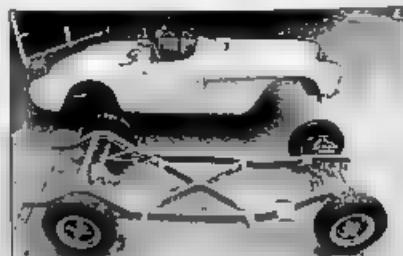
can be built for as little as \$6000! Good luck with your first project. We recently visited Fiber Jet, and that Sand Hopper sure looks like a lot of fun to build and even more fun to drive. We also hear that the company is developing a street/dune buggy that uses a stock length Volkswagen pan.

CORVETTE CHASSIS

I enjoyed the Concept '57 article in your March '95 issue ("What a Concept") is there a not so-expensive frame available for the Concept '57 (maybe a modified '78-'88 Marajo or Monte Carlo frame)? Also, are there any companies reproducing the removable hardtops for the early Corvettes?

Joel Willett
Depere, WI

We suppose any number of chassis/frame options are available for the Concept '57, including custom-made frames from street rod sources, modifying existing frames or Corvette salvage. Straight out of C-Central's catalog, for example, is an authentic-reproduction '53-'62 frame for about \$3600. That might be the way to go if a faithful reproduction car is desired, but once you add all the appropriate suspension items you are still looking at about \$5000. According to one 'Vette fanatic we talked to at C-Central, the least-expensive way to get a chassis under the Concept '57 is to find a rusted '56-'62 frame and have it repaired. Apparently these frames are plentiful, but restoration guys shy away from them because they won't "look right" when they are finished. About \$900 will get you a frame, which can easily be repaired, and you can add a Mustang II front crossmember to it for a great '57 chassis. Going that route will cost less than \$3000. Our source tells us that you would probably be surprised by the response to a want ad for a rust-



ed frame placed in a 'Vette-afficionado publication. As for the hardtops for '50s 'Vettes, some prohibitively expensive

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KIT TECH

repairs are available, and C-Central may eventually offer a reasonably priced hardtop to fit the Concept '57 car.

LOOKING FOR MR. KELMARK

Do you know if the VW-based Kelmark GT is still in production? If not, do you.



know of any Kelmark clubs where I might find some information on acquiring one? By the way, do you know if the Kelmark GT was ever (or could be) adapted to a Porsche 914 pan?

Garry Dufford
Denver, CO

I'm a proud owner of a Kelmark GT. I've owned it for five years. Can you help me find parts or someone out there who knows about my kit? What can I sell it for?

Jim Sumers
Aurora, CO

I still have the complete information package I received from Kelmark Engineering in Okemos, Michigan, in 1974. Now, as I understand it, this company is no longer in business. What about Kelmark of Ontario, Canada? Has anyone purchased this firm or its inventory? From the literature, it seems that this firm had "the right stuff" and was too good to die out. Are there any Kelmark parts still available?

Clarke Peters
P.O. Box 876
Janesville, CA 96114

Jim Sumers meet Garry Dufford. Garry Dufford meet Clarke Peters. Unfortunately, the Kelmark firm no longer exists. We contacted Bill Westfall, who says he has the molds, but he was reluctant to help and declined to send us any information. There seems to be quite a few Kelmark cars out there, so kit car clubs in your areas may just have one as a member, with a willing owner who is happy to share information (see "Join the Club," May '95). It also seems like a need that some entrepreneur could fulfill. We get a number of letters about Kelmark, and surely someone could become a supplier of parts, information, registry and

components for Kelmark cars. As for the Porsche 914 question, we're not sure if you could use the whole platform, but surely the engine and the transaxle could be utilized.

WHETHER TO WEATHER STRIP

I am building a Sterling and need to add some weather stripping around the doorjamb and so on. Are there any secrets to doing a neat job and getting the best seals?

John Cobb
Memphis, TN

To help you attach weather stripping and other rubber components, we suggest you call SoftSeal (800/426-0902) and request a free copy of its Installation and Product Information Booklet for Cars and Trucks. The booklet covers removal and installation of weather stripping and the tools and supplies necessary to do a good job. To install hood, trunk and door rubber, we found the commercial-grade weather strip adhesive (\$5.95 for a 5oz tube) from The Eastwood Company (800/345-1178) easy to work with, quick and strong.

PORSCHE PURSUIT

Approximately two years ago, I saw an article in your magazine that featured a 959 Porsche kit. The kit used a 911-series body as the base for the conversion. I believe the company that produced the kit was in Santa Ana, California, but I'm not sure. I also seem to recall that the feature car in your magazine was pale yellow. I have seen two of these cars on the road but have been unsuccessful in locating the factory. Can you please help me?

Karl Schuler
Lake Forest, CA

We believe the car you refer to is the Getty Vision (714/541-8424), indeed located in Santa Ana. You might also want to contact Fiber Jet (916/783-3198), another kit company that produces a 959 look-alike based on a Porsche 911 donor. The 959 is particularly intriguing as a replica, even dismissing the fact that a real one costs somewhere in the mid-six figures. Consider the plight of those like Microsoft billionaire Bill Gates, who have purchased real ones only to have them terminally impounded by the Department of Transportation.

Having a technical problem assembling your kit? Send your questions to Kit Car, Kit Tech, 6420 Wilshire Blvd., Los Angeles, CA 90048-5515. (No phone calls, please. We're sorry, but we are unable to respond privately.)

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SHOW-OFF



WEDDING BELLS

Thank you so much for the story on my Fiero ("Instructions Not Included," September '94). Here is a picture of my bride Judy and me. We were married on August 24, 1994.

J.D. Robbins
Rocky Mount, NC

KANSAS EYE-CATCHER

The first time I saw a Sterling I was at the '89 Pocono Raceway Kit Car Show. The Sterlings on display had everything from the standard VW engine to a 3.8 Buick V6 installed. At the Club Sandwich in Laughlin that fall, I met George Evans, who owns a Scirocco-powered Sterling with a beautiful paint job, and I decided that I had to have one.

About a year later, Robbie Robinson called to tell me he had found a Sterling. It had been ridden hard and put away wet, but the price was right. It had a VW 1835 with twin Weber DCNF 40 carbs. My wife Claire felt that I needed a winter project, so we paid the price and had it shipped to Kansas.

A year and a half later it was finished. I stripped it almost to the frame, repaired the body damage, modified the headlights to take the rectangular type, added Honda motorcycle turn signals, and rewired and modified the dash, which included moving the shifter 12 inches to the rear and installing a new center console and glovebox. I also installed the radio in the roof and added Mazda remote-controlled mirrors and a new cloth interior. In addition, I opened up the engine access area, built a new rear deck with a spoiler, added electro-hydraulic top operators, side marker lights and an eyebrow over the rear window that now houses both upper turn signals and a third brake light. With a new light-blue metallic paint job, the Sterling was on the road again. In California, it wouldn't draw much attention, but in Kansas it's a real head-turner.

Bob Shipe
Haysville, KS

GOLDEN WHEELS

When I began building my Marlene from Classic Roadsters Ltd. just prior to my retirement, I didn't fully realize what an excellent choice it was for my fixed-income lifestyle. The car's classic appearance, inspired by the '36 Mercedes 500K, makes it forever new and has released me from the great American penchant for trading in every three years. The Ford 302 V8 and automatic transmission should provide many years of service, and parts should be available when needed. Also, the detailed knowledge I acquired during the car's construction has provided me with an immunity to mechanics' bills, except when repairs require expensive equipment, such as wheel alignment.

Originally, I built the kit car simply because I wanted to. But with an old pickup for fishing trips and foul-weather driving, I have discovered that the kit car is a very good choice for retirement. This photo was taken after three years on the road to document why I felt no compulsion to trade it in.

Don McDaniel
Carson City, NV



FAMILY HEIRLOOM

I'm the owner of a '36 Jaguar SS-100 replica kit car, manufactured by Antique & Classic Automotive. The kit was originally built by a friend of my father, who put the kit together in his garage in Bass Lake, California. When my father's health began to fail, he transferred ownership to me, and the SS is now my daily driver. It's powered by a '75 Ford 2300 four-cylinder Pinto with a four-speed German transmission. The SS is completely street and emissions legal. The interior sports a mahogany dash with a full set of VDO white-face chrome-bezel Classic gauges and a JVC AM/FM/cassette stereo. The steering wheel is a Grant GT, which includes the Grant Removable Security System. The exterior is red with a tan top and interior.

Jack Simpkin
Huntington Beach, CA

Dear Reader: Show us your kit car! We know how proud you must be, so here's your chance to tell others about it. Take a few snapshots and jot down some details about your project, and send them to Show-Off, Kit Car, 6420 Wilshire Blvd., Los Angeles, CA 90048-5515.

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